GEMS

BRIDGMAN

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GEMS

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To
Zona Gale

Lover of Gems in Earth and Sky

HOW IT BEGAN.

Gems in their appeal are like the stars. They enchant the eye, they stir the imagination. Then, as with cats and clocks, they are "company."

A valuable stone is the one thing that endures. Lace is soon a rag, velvet impossible, flowers dead; but a jewel, if treated kindly, lives forever. It is indeed almost as indestructible as truth or a mighty love.

The very word evokes a picture. Is there a richer syllable than "gem"? With the jeweler it means the finest of its kind. But the scholars say a gem, whether of emerald or quartz, is not a gem unless engraved.

Other times, other manners. These days the art of gem engraving scarcely exists, while precious stones are everywhere. Before a fine specimen, "gem" leaps to the lips involuntarily. It is suggested that the business classification be known as gemology in distinction from the mineralogy of science.

Treatises on gems, comparatively few, difficult of access, generally reference books, are often tough reading. The scientist may be great and useful, but for the neophyte he has scant regard. It seemed as if a small volume, depicting in simple words the salient features of precious stones, garnering from the huge harvest of research the easily assimilable, might not come amiss. If we cannot know all, let us at least grasp something from that vast world of interesting facts to which so many women who wear jewels and men who buy and sell them seem indifferent. Gems have many sides, and even laymen may attain a few.

Nothing is more bewildering to the beginner than the manner in which the various mineral families masquerade in one another's clothing. It would be no trick at all were the garnet always red, the sapphire always blue, the topaz always yellow, as at first we suppose. Nature seems positively to enjoy playing pranks which turn all preconceived notions topsy-turvy. Increasing experience confers that sixth sense which gradually distinguishes one family from another. Yet even experts, to be absolutely sure, must sometimes resort to scientific tests. These are the triumphs of modern times over the simple file of the ancients. Now, hardness, specific gravity, refraction, dispersion, dichroicism, by means of delicate and often inexpensive instruments, can precisely be determined.

To own a few good stones is an education. Like pictures, their qualities come out only in close association. A judiciously purchased collection may prove a good investment. Money put into them is wasted no more than in travel, perhaps the best of all investments,

since it never can be wrested from us by theft, panic or fraud. Gems stimulate curiosity and make us want to travel; to those bright warm lands whence most of them come; to those dark people who forever "call."

Never shall I forget a certain morning at Colombo, Ceylon, in Aladdin's palace as it were. I sauntered in quite unconcernedly, asking for moonstones, and the thing that happened was the heavens opened and showered down clouds and planets and astral bodies; while the earth heaved and threw up the gems she so long had concealed in her dusky bosom—and I gasped and wondered. Glowing rubies; amazing cat's-eyes; sapphires of every quality and hue; pearls in great extravagant heaps; moonstones as common as pebbles on a beach; garnets, spinels and the strange alexandrite, green by day and red at night; most, if not all of them, the product of Ceylon—a riot of beauty, an orgy of color; and all for such little sums, as compared to the king's ransom necessary for their purchase on Fifth Avenue.

There was an opal, the wedding of sunset with moonrise, of dawn with evening, of poetry with music, of the sky with the rose, that a woman would sell her soul to possess; and though I might want for bread, it became mine. It is a privilege to own a thing perfect of its kind, and this was the most beautiful opal ever seen in Ceylon; actually a *passionate* stone, which had to be placed far away from my gray-blue jade—so calm, ethereal and pure.

Then the antique Indian jewelry, the fine filigree work, the ropes of pearls and exquisitely wrought gold, with flesh-tinted carnelian, the ancient sard, peeping out at intervals. Bracelets, anklets, coronets, necklaces, ear-drops, and rings; flexible gold chains, heavy as lead; precious stones encrusted on solid gold plates; all some hundreds of years old, and once the property of the wealthy great. How they speak to you—these eloquent specimens of a skilled handicraft fast passing away; and how they make you pray that such splendid art may not die, but suddenly rise up and live a thousand years.

My last glimpse of Ceylon embraced her civilization in microcosm—the ocean in a single drop. It was then, with the sea breaking in long, creamy lines close to the rickshaw, the blood-red road leading into the wonder of green, that men, women and children sank into insignificance beside the one penetrating fact of a tropical land; a land which asks no odds of any human being, but conceives, blooms and fructifies without bargain or stint. It is not the Cingalese, subtly alluring though they may be; it is Ceylon herself—alive, eternally youthful, eternally fecund. Here, beauty is a vital, palpitating thing; here green shoots forth, buds blossom, fruits ripen, gems are tossed up, as you gaze. Nature need never be coaxed, she opens her arms wide and surrenders herself gladly. Thus will this paradisal isle ever rise before me—as a young ardent mother, with a stirring life always beneath her heart, and forever giving of her blood and substance for love alone.

GEM LITERATURE.

Theophrastus, successor to Aristotle, was the father of mineralogy. Of all the extensive literature regarding stones referred to by Pliny, only his one little treatise, fortunately incorporated by Pliny in one of his own works, is extant. Pliny wrote two books on gems in his Natural History, a prodigious work of many volumes, full of scholarship, if not originality. He cites first Socatus, as "one of the most ancient writers on the subject," apparently a physician at the Persian court, for he states that he had seen the wondrous Dracontias, probably the first diamond, in the possession of "The King," who, designated by this sole title, could be no other than the King of Persia, says C. W. King, the English clergyman, scholar and gem expert, from whose summary these items are abridged.

Theophrastus wrote his meagre treatise 300 B. C. Between Theophrastus and Pliny none have lived, except in casual quotations by the latter, though many wrote. Pliny perished in the destruction of Pompeii, after a life devoted exclusively to study. He studied by night as well as day, his assistants reading to him while he ate, even in his bath. Study alternated continuously with sleep, and light repasts, and it was not suspended on journeys. His sole outing was a visit before daybreak to the Emperor Vespasian, the strong and wise, with whom he was on the best of terms, and who died the same year as himself, A. D. 79. Vespasian, General and soldier as well as Emperor, evidently did not object to such an early caller, and gave him various commissions to perform, after which Pliny would return to his books. He was heard to say that there was no book, however bad, from which some good could not be obtained. Yet one might well wish a little personal investigation could have taken the place of so much learning.

The next in importance is Solinus, who wrote a couple of centuries after Pliny, probably during the feeble revival under Constantine. He was a jeweler and connoisseur, and puts into better form and describes more exactly the information Pliny dug out of his authorities, sometimes with too little reference to the living fact around the corner.

Epiphanius, Bishop of Solamis, in Cyprus, composed about 400 A. D. a small tract upon the twelve stones of the High Priest's Breastplate, or Rationale. He refers occasionally to valuable sources of information then accessible, but quotes from memory or else transcribes without understanding. He confuses stones, makes absurd mistakes, and seems more absorbed in their medicinal virtues than anything else—those virtues which together with their mystical powers were believed in by many mineralogists from early Greek times to the Renaissance. Epiphanius is of special value in his defini-

tion of the three species of Hyacinthus; and his allusion to Adamas as a sky-colored stone, a proof that this ancient authority knew as such the sapphire.

Isidorus, Bishop of Seville, in the seventh century, contented himself with abridging Pliny's definitions and quoting Solinus. He also believed in the medicinal virtues of gems. He quotes some writers concerning this, probably either Epiphanius or the pretended Evax.

In the eleventh century flourished Marbodus, Bishop of Rennes, who published a Lapidarium dealing mostly, but not originally (except for putting his cribbings into hexameters), with the medical and magical properties of stones.

The tendency during the Middle Ages to emphasize this rather than the scientific or artistic side of the subject has occasioned the loss through neglect of many really valuable works, such as those of Socatus, Sudines and Zenophemis, the main authorities of Pliny.

The Lapidarium of Marbodus is the last work to treat, however imperfectly, of the natural history of stones. After him came the sigils, borrowed from the Arabians and the Jews, in which the signs on gems, astrological and the like, are of more importance than the stones themselves. For instance: Goat engraved on chalcedony tendeth to the getting of wealth. Keep this in thy money-box and thou shalt always be rich.

From the eleventh to the fifteenth centuries, this sort of thing prevailed. Then in 1609, after a few sporadic writers in brief treatises did something for mineralogy, came Aselmus de Boot, a native of Antwerp, physician to Rudolph II., who published "De Gemmis et Lapidibus." This volume breathes the very spirit of the times in the way it clings to the medicinal properties of stones as against their magical powers. He illustrates clearly the strange struggle then going on between different kinds of superstition and common sense; for while speaking respectfully of their medical virtues, denouncing the magical, he at the same time displays much critical knowledge in his attempts to identify the gems known to the ancients by names transferred to others in modern times; and it was naturally a satisfaction to King, who patiently compiled this list, to find De Boot agreeing with himself on many points, though his own investigation was made from an independent point of view.

Incorporated with De Boot's works, in its second edition, 1647, is the text of Theophrastus, with a commentary, and another shorter treatise, "De Gemmis," by A. de Laet, dedicated to Elizabeth, daughter of the unfortunate Frederick, King of Bohemia, and granddaughter to James I. of England.

"Both treatises," says King, "have been the source whence subsequent writers on precious stones have drawn all that is valuable in their pages, and that without acknowledging their obligations."

King's plan, like theirs, was to combine the ancient with the modern natural history of the subject, a thing not attempted by later mineralogists, whose writings are either purely scientific or else from the standpoint of trade.

His own object, King says, was first to establish a sound system of nomenclature in the antique department; to define each species with precision; to consider all these substances in their bearings upon art and history; and lastly, "to supply accurate guidance to the admirer in our own days of these the choicest of Nature's treasures."

It is interesting to note how many in the above summary were either clergymen or physicians. King himself, author of several valuable books on antique gems, for one. It is only now and then that a jeweler publishes his more exact if less "literary" knowledge. Yet the only important works since 1875, when King disappeared from public view, are by mineralogists and dealers in precious stones. As an elegant study for men of leisure, the subject seems to have passed.

Only a few men within the last half century have written authoritatively on stones besides King, whose specialty was carved gems. Among these are Hodder M. Westropp, the archaeologist; Dr. Max Bauer, with typical Teutonic thoroughness and detail, on precious stones; Emanuel, Streeter, W. R. Cattelle and George Frederick Kunz, jewelers and connoisseurs of yesterday and to-day.

CARVED GEMS.

For nearly three thousand years "gem" meant something altogether different from what it does to-day. In archaeology it does not signify the highest expression of a valuable mineral, but an engraved stone, whether precious or semi-precious or simply a bit of hard primitive rock. It stood, one might say, not only for personal decoration, sometimes on helmet, sword, shoe, besides ear, neck or hand, but for all prominent features in world progress. Gem engraving recorded in an imperishable form the course of history, the complications of mythology, the development of the arts—to say nothing of playing a large part in emphasizing the authenticity of documents and enhancing the pomp of ceremonies. At a later period when as an art the importance of carved gems had declined, they yet stood, among men of mind as well as the credulous, for medical efficacy and magical power.

The comparatively few precious stones owned by the ancients were so highly valued for themselves alone that the engraver avoided them. Indeed, quite apart from the question of their value, they were a difficult medium for the art of engraving. That found its best expression in much less expensive materials than the diamond, ruby, sapphire or emerald; above all, in the many varieties of the quartz family, some transparent, more translucent, many opaque. Amethyst and rock crystal represented the first; sard, or Oriental carnelian, sardonyx, the entire agate family, including onyx and chalcedony, the second; the various shades of jasper, the bloodstone and plasma, the third. In these less artistic if more extravagant times, such substances for personal adornment are scarcely noticed; but through several epochs of history, beginning with the Egyptians and their rude cylinders 2000 B. C., spreading through Persia, Asia Minor, Sicily, Greece and Rome, carved gems marked the height of civilization and refinement.

First indicated by crude figures on ordinary stone, confined to the seals of Egypt and Persia, the glyptic art, as it is called, so developed and improved that during the Greek period it ranked, as an expression of the beautiful, with statuary. Rome, under the Augustan sway, with its eye on Greece, was also conspicuous for a great degree of efficiency; but from that time on the art step by step declined until it almost expired. While reviving for a few centuries under the impetus of the Renaissance, it sank again into mere routine as the world in other ways advanced. The present era, with tools which guarantee mechanical perfection, sees this great art again languishing unto death from sheer poverty of ideas.

To modern work there is practically no worth. Its best estate, like the celebrated Poniatowsky collection, the wonder of Europe until its fraudulence was exposed, is skillful imitation of the antique. Even that has greatly declined since Natter's or Poniatowsky's time. While the design may be reproduced by clever mimics, the stone itself has that hard, brilliant polish, that bold, unveiled surface which differentiates it at once from such art in its prime. The soft hand polish, innocent of disk or wheel, dependent entirely on emery and "elbow grease," assisted materially by the passage of time, tells the authentic article almost as assuredly as the authoritative testimony of unimpeachable archaeologists.

In those old days, every man or woman with any pretensions to elegance had a seal ring, which was precisely that—to seal the wax on letters or legal documents. Larger stones also were beautifully engraved for bracelets, vases, plates, and other ornamental uses, either domestic or public, but it is these rings which appeal to us most strongly. The barbarians, after conquering and ravaging the Roman Empire, put these priceless relics of a prostrate civilization into the melting-pot for the sake of the gold, throwing away the supposedly worthless stones, and that is why we moderns have received such a rich inheritance—the ten thousand authentic carved gems now preserved in all national and some private museums. Tossed aside by the ignorant and the heedless, Mother Earth kindly took them to her bosom, to yield them in time, through the efforts of the patient archaeologist, to more appreciative beings.

Some plainly show the effects of the fire; and likely cremation was responsible for this not less than the vandals' melting-pot. More, fortunately, are damaged but little. Often they are engraved with the owner's name, sometimes with the artist's, again with both. Then there is the Imperial portrait, frequently with or without a bit of mythology, an incident from history, a scene in domestic life. All touch our hearts as only intimate personal possessions, surviving the wrack of the ages, may and can.

No picture or statue, no church, palace or pantheon, though great in design and rich in story, can thrill us quite so keenly as these bits of stones, covered with the most significant designs, which once graced the hand of gallant man or lovely woman. Small and apparently fragile, they have brought down more vivid testimony to ancient customs, fashions, wars and religions, national and civic ambitions and achievements, Imperial triumphs and the slaves' daily grind, than massive tomes or ruined piles.

"Gems," says King, "are the sole imperishable vehicle of ancient genius; they alone preserve to us the reflex of the statuary, and of all of painting, in the times from which they have descended to us."

Another writer declares: "In the gems that have been worn by any civilized people, we possess an epitome of that people's arts, their religion, and their civilization in a form at once the most portable, the most indestructible and the most genuine."

It therefore can readily be understood why an expert in carved gems must be all and much more than an expert in precious stones.

He must be able not only to judge the material itself, but the artistic quality of the design; and to decipher its meaning and import must be no little of a scholar in all classic lore. Then, so clever have been the imitations, and at one period, during the time of Natter, in the eighteenth century, so wholesale were the attachments to both genuine and false antiques of the names of distinguished ancient artists, that the whole study became a mass of confusion from which only the life efforts of King and his like have partially extricated it. The public as a whole seems to take no interest in this most fascinating of all studies, but those who pursue it even a little way are apt to succumb entirely to its mystery and charm. As in Greece, Italy and Egypt excavations are all the time disclosing these tiny evidences of a glorious past, the study is one which lures across the ocean as well as into the collections of our own Metropolitan Art Museum, excellent in its way even if bereft of some of the splendid gems of Europe.

Carved gems are divided into two classes, the intaglio, or concave work, and the cameo or convex. The first is produced on any of the semi-precious stones mentioned above, and on a few of the precious, in low relief, as a rule covering the entire surface except the margin left for setting. These intagli are small, generally for rings, though they may be constructed on a large surface if desired. The sardonyx, that beautiful expression of the sard and onyx, usually in three layers, red, white and brown, was the favorite medium in ancient times for the cameo, the different colored layers being taken advantage of in every way to produce the required effect. In these days, the cameo is popularly associated with a rather delicate shell, white on a pink or black background, but for intrinsic beauty as well as durability there is nothing like the design and execution of the ancient artists on stone. Sardonyx was also used extensively for the intaglio.

A famous stone cameo was the sardonyx on which was carved the portrait of Queen Elizabeth, set in a ring which she presented to the Earl of Essex, as a token of her friendship. Sentenced to death, he sent this ring to his cousin, Lady Scroop, to deliver to the Queen. Unfortunately, the messenger delivered it to the wrong person—Lady Scroop's sister, Countess of Nottingham, who hated Essex and desired his death. She kept the ring, Essex was executed, and only on her death-bed did she confess her treachery to the Queen, who, tradition says, shook the dying woman in her fury, violently crying out: "God may forgive you, but I cannot!"

The tools by which this delicate work was performed, in the palmy days of the Greek and Roman art, consisted largely, both for polishing and cutting, of corundum, either in sharp points attached to instruments of iron for the engraving, or a powder for the polishing. Corundum is the substance which crystalizes into sapphire, and which in an amorphous state forms emery, the ancient stone of Naxos. Next to diamond it is the hardest substance known. The latest and most authoritative decisions regarding diamond, despite the weighty opinion of King, have been to the effect that it was never used in engraving previous to the time of Pliny, in the first century

of the Christian era. Corundum, called adamas, took the place filled so universally in these days by diamond; partly because the diamond, if known at all, was a very scarce stone, even among the wealthy, as late as the fifteenth century; partly because the semi-precious stones could easily be manipulated by corundum, or even a stone considerably less hard.

The scarab has its place also among carved gems. It is a beetle, cut cameo fashion in high, almost full relief, the underside flat, upon which is engraved the intaglio or cartouche. Egypt was the country from which the scarab emanated in the long ago, and it retains its popularity there to this day. The scarabeus is emblematic of the origin of life, being supposed originally to reproduce itself, each in its own person. At the time of the greatest prosperity in Etruria, there was close commercial relation, via Phoenicia, between that country and Egypt. Hence the prevalence of the scarab in Etruria's tombs and ruins to the present time. The Etruscan can be distinguished from the Egyptian in several ways, but the most conspicuous characteristic is that while the material of the Egyptian was limestone, or some equally inexpensive substance, the Etruscan in ninety-nine cases out of a hundred was carnelian, found in great quantities in the beds of Etruria's streams. These are more valuable in a sense than the Egyptian, but lack the intrinsic charm of the latter, the artistic coloring painted by skillful hands on an otherwise unattractive substance, and the highly interesting hieroglyphics. The intagli of the Etruscan are similar to those on other carved gems of Rome, scenes from mythology or history, but they are by no means as ancient as the scarabs of Egypt, some of the latter dating back to the times of the Pharaohs.

As the most desired scarabs are of Egyptian origin, and the most beautiful intagli those of Greece, so the cameo reached its culmination under Roman influence, in the reign of Hadrian.

The Greeks, the greatest artists of all time, always respected the nude, while the Romans clung to drapery. "This requirement of Roman taste," says Westropp, "was very unfavorable to the development of the beauty of this art, and engraved stones executed at Rome evince this influence. The figures seldom trespass against the rules of design, but they are deficient in elegance, they seldom bespeak either genius or elevation of mind in the artist. The ideal, which is the soul of Greek composition, is never perceived in that of the Romans; and the art sensibly declined into that of a servile imitation."

The Greeks who were attracted to Rome, even the great Dioscorides, had to bow to this prejudice of the Romans in the matter of the nude. Consequently the best purely Roman work is largely in portraits, generally in cameo, and this branch of the art, because of the Roman passion for portraiture, both of ancestors and contemporaries, maintained itself long after merit in the intaglio had vanished.

Astrological gems attained extreme popularity in the later Imperial times. These display frequently the signs of the zodiac. Often

they plainly represent the owner's horoscope. But many disclose the zodiacal sign of some fortunate great man. Hence, the frequency of Capricorn, under which the great Caesar Augustus was born.

The fifth century witnessed the practical extinction of gem engraving. For many decades before, the downward tendency of this art as an art kept pace with an increasing interest in it as a medium for talismans, which after the disappearance of anything like glyptic ability gradually resolved itself into the ill-cut, badly-designed Gnostic gems, on coarse jasper and loadstones. These have nothing to do with the Mithraic intagli, devoted to the worship of Mithras, the Persian idea of the sun. He is usually represented as a young man plunging his sword into the throat of a bull, while a dog licks up the falling blood. The bull is the earth which the sun penetrates with heat, while the dog is the things nourished thereby. Cleopatra's signet ring was an amethyst, engraved with the figure of Mithras, symbol of the Divine Idea, source of Light and Life, as becomes the most passionate woman of history.

The Gnostic belief, which started among certain sects in Egypt, the East and the Roman Empire, during the second century, but did not hold full sway till three or four hundred years later, was that the stones themselves, with the symbols engraved upon them, exerted great influence on the mind and body, in inspiring love, frustrating the evil eye, or curing diseases. Abraxas is the name given to the most conspicuous of these deities, the earliest of which are the Egyptian, with the good genius Kneph, a snake with lion's head, the creative spirit, or sun; then Seth, the evil deity of the Semitic tribes, a demon with an ass's head; and last, the god Abraxas, the supreme solar deity, with the head of a cock, sacred to the sun, a human body clad in a cuirass, with serpents instead of legs. About all these deities were cabalistic signs or letters, as crudely cut as the images themselves, laden with import.

Abraxas, as the good spirit, was supposed to be in continual conflict with Seth, the evil one, both representing the two antagonistic principles in nature. In the Gnostic creed the Devil was regarded as the creator of the world, and was therefore of the utmost importance, either in this life or the next. Matter, as they looked at it, was from its nature evil, consequently the supreme deity, the type of the good, could not be its author.

Intagli farther back than the Gnostic symbols, indeed in the intelligent time of Hadrian, in the second century, present frequently the head of Serapis, "the one god Serapis," whose worship was very much the fashion during that reign. Serapis is an Egyptian deity, borrowed by the Romans; and under Hadrian a favorite object of worship was the double god, Jupiter Serapis—the Roman Jupiter, or Zeus, assuming the attributes of the Egyptian spirit, who presided over the dead. He is usually represented with a modius on his head, the modius being a peck measure.

The subjects of ancient gems, indeed, embrace the whole world of ancient art, and follow the laws of its development in logical

sequence, animal forms being succeeded by deities, these again by the striking deeds and attributes of heroes and myths, and finally by portraits, historical representations and allegories.

One habit of the ancients in the matter of carved gems the moderns are now imitating in the gold settings for precious stones—that which once was engraved upon the stones themselves being now wrought in the metal surrounding them. That is, bacchanalian subjects were often engraved on amethyst, supposed to prevent intoxication; marine, on beryl, the gem of the sea; martial, on the fiery red sard or jasper; rural, on green jasper or prase; celestial on the pure chalcedony.

The great classic gem engravers of ancient times were followed by gradually deteriorating talent till the art fell to its lowest estate. It was practically lost during the general fall of the arts under the Byzantine Empire in the ninth century. But with the rise of Lorenzo de Medici a new impetus, under his patronage, was observed. A number of Italians, never equal to their ancestors, worked with more or less success to the middle of the sixteenth century. It was a little later than this that Nassaro of Verona, who engraved under Francis I, produced a crucifixion on heliotrope. The ancients believed the red spots on green jasper, their heliotrope, our bloodstone, to be the life blood of Phaeton, the god of the sun, overturned and wounded by his chariot in the sky, hence "heliotrope," from helium, the sun. In this remarkable work of Nassaro's, the red spots seemed drops of blood issuing from the wounds of Christ—a striking but rather degenerate application of the art.

Next, the Germans, in the seventeenth century, under Rudolph II, for whom Lehmann engraved at Vienna, became interested in the subject. Natter, of Nuremburg, who died in 1763, was celebrated for his intagli, really very beautiful, but now pronounced by the best authorities to be merely imitations of the antique. In the nineteenth century, a few English engravers made themselves felt, but the modern lover of carved gems would exchange all subsequent works for one little subject by Evodus or Discorides, or even a far more humble artist flourishing any time between 400 B. C. and the end of the Augustan period, say 200 A. D. It was around the former date that fine gem engravers and their exquisite works were ranked high among men and achievements of the times, sung and celebrated by musicians and court poets, even by kings themselves. It was in these halcyon days of the art that Theodorus engraved the signet ring of Polycrates; that Mithridates founded the first royal cabinet of gems; that Alexander the Great would allow no artist but Pyrogoteles to engrave his royal countenance, and that only on an emerald. It was under this monarch, indeed, that the Hellenic glyptic art reached its climax, and was able to sustain itself, by more or less transplantation to Rome, on a high plane of excellence till the fall of the Caesars.

During the Middle Ages the absorption in gems of all kinds prevailed to such an extent as to border on fanaticism. From the lordly diamond down to the humble agate, each possessed some

special significance and power. Kings not less than slaves clung to their amulets and talismans.

Farther back still, the ruby, sapphire and zircon, divided into male and female, as they were intense in color or weak, were supposed in the bowels of the earth to propagate their kind. They were classed among the things endowed with life. Even when this notion passed away, the belief in their supernatural powers prevailed.

Not till mediaeval times did birthstones come in, but they have increased in favor ever since, and to-day are receiving large attention from the trade. It is an amiable weakness at worst, this propitiation of a power neither to be measured nor defined, though its actual office may be no more than by suggestion to kindle possibilities within ourselves.

STONES IN THE BIBLE.

How the power, the wonder, of gems makes itself felt in the Bible! It meets and mingles with the stern majesty of the truth like a vital, living thing. Those strong men of God surrendered to the enchantment of emerald or ruby as never to that of woman or wine. The love of sparkle and color was a weakness of the flesh for which they were not called by conscience to account.

Some of them did not know exactly what they were talking about—as when St. John, in his vision of the Holy Jerusalem, described her light as "like unto a stone most precious, even like a jasper stone, clear as crystal."

Not only was jasper, even in those days, when gems were comparatively rare, far from "a stone most precious," but as it is always opaque, an impure form of quartz, it could hardly, even in a vision, seem clear.

But if you leave mineralogy for poetry, then indeed you are well rewarded. There are few passages in all literature on precious stones more beautiful than some in the Testaments, both Old and New. The high art born of the sincere soul, the single purpose, penetrates these deathless writings in every part.

Daniel sees in his vision "a certain man," who is the Lord, and who fills him with both weakness and strength. Him, in all reverence, as he suddenly appeared, after the prophet's long fast, he thus describes:

> His body also was like a beryl, and his face as the appearance of lightning, and his eyes as lamps of fire, and his arms and his feet like in color to polished brass, and the voice of his words like the voice of a multitude.

Again in "The Song of Solomon," the beryl illumines a passage of similar import and beauty:

> His hands are as gold rings set with the beryl; his belly is as bright ivory overlaid with sapphires.
> This my beloved, and this my friend, O daughters of Jerusalem!

Poor old patient long-suffering Job through all his trials held tight to Wisdom and reckoned her above all earthly things, even above the most precious of stones:

> As for the earth, out of it cometh bread; and under it is turned up as it were fire;
> The stones of it are the place of sapphires; and it hath dust of gold.
> There is a path which no fowl knoweth, and which the vulture's eye hath not seen:
> The lion's whelps have not trodden it, nor the fierce lion passed by it.

He putteth his hand upon the rock; he overturneth the mountains by the roots.

He cutteth out rivers among the rocks; and his eye seeth every precious thing.

He bindeth the floods from overflowing; and the thing that is hid bringeth he forth to light.

But where shall wisdom be found? and where is the place of understanding?

Man knoweth not the price thereof; neither is it found in the land of the living.

It cannot be valued with the gold of Ophir, with the precious onyx, or the sapphire.

No mention shall be made of coral, or of pearls: for the price of wisdom is above rubies.

Proverbs continues the exaltation of wisdom, as well as its comparison to precious stones, so ardently as sometimes to fall into repetition:

For wisdom is better than rubies; and all things that may be desired are not to be compared to it.

She is more precious than rubies: and all the things thou canst desire are not to be compared unto her.

There is gold, and a multitude of rubies; but the lips of knowledge are a precious jewel.

Again does Proverbs use the most precious of stones to make a vivid comparison, not untinged with doubt and cynicism:

Who can find a virtuous woman? for her price is far above rubies.

Beholding Zion's pitiful estate, Jeremiah breaks out into his Lamentations, and recalls that once—

Her Nazarites were purer than snow, they were whiter than milk, they were more ruddy in body than rubies, their polishing was of the sapphire.

Ezekiel's vision was "the likeness of a throne, as the appearance of a sapphire-stone," which he saw "as the color of amber, as the appearance of fire round about within it."

In Exodus the story runs:

Then went up Moses, and Aaron, Nadab and Abihu, and seventy of the elders of Israel;

And they saw the God of Israel: and there was under his feet as it were a paved work of sapphire-stone, and as it were the body of heaven in his clearness.

In Isaiah we come again upon the sapphire-stone used in the sense of a pavement; the additional word "stone" is explained when you know that the sapphire, or sapphirus, of the ancients was our lapis-lazuli—altogether appropriate, in its size and azure blue, for the floor of heaven.

Comforting the Gentiles, the prophet says, in the name of the Lord:

O thou afflicted, tossed with tempest, and not comforted, behold, I will lay the stones with fair colours, and lay the foundations with sapphires.

And I will make thy windows of agates, and thy gates of carbuncles, and all thy borders of pleasant stones.

Ezekiel, inveighing against Tyrus as the city of too great luxury, cries out:

> Syria was thy merchant by reason of the multitude of the wares of thy making: they were occupied in thy fairs with emeralds, purple, and embroidered work, and fine linen, and coral, and agate.

Reproving the Prince of Tyrus for his impious pride, he declares:

> Thou hast been in Eden the garden of God, every precious stone was thy covering, the sardius, topaz, and the diamond, the beryl, the onyx, and the jasper, the sapphire, the emerald, and the carbuncle, and gold.

A line in Jeremiah is interesting because it is, with one other, the only mention in the Bible of the diamond, which then must have been very rare, if not wholly unknown, yet is here described, in its use at least, with the greatest accuracy:

> The sin of Judah is written with a pen of iron, and with the point of a diamond.

These include all references to precious stones in the Old Testament, except the High Priest's Breastplate. Aaron, the first High Priest, tells what it shall be in Exodus 28, and describes it completed in Exodus 39:

> Four square it shall be, being doubled, a span shall be the length thereof, and a span shall be the breadth thereof.
>
> And thou shalt set in it settings of stones; the first row shall be a sardius, a topaz, and a carbuncle; this shall be the first row.
>
> And the second row shall be an emerald, a sapphire, and a diamond.
>
> And the third row a ligure, an agate, and an amethyst.
>
> And the fourth row a beryl, and an onyx, and a jasper.
>
> And the stones shall be with the names of the children of Israel, twelve, according to their names, like the engraving of a signet; every one with his name shall they be according to the twelve tribes.

In the New Testament, except John's Vision in Revelations, precious stones are used more frequently to point a moral than to adorn a tale. The Old Testament seems more mellow, richer in thought and culture, the New stronger in religious zeal, exortation and practical application. Pearls in their purity greatly appealed to the clean, austere minds of the Apostles:

> The kingdom of heaven is like unto a merchant-man seeking goodly pearls:
>
> Who, when he had found one pearl of great price, went and sold all he had, and bought it.

Again Matthew shows his reverence for these gifts of the sea:

> Give not what is holy unto the dogs, neither cast ye your pearls before swine.

Thus they appeared to Matthew; but Timothy, a minor disciple, evidently stood in fear of them, as savoring too greatly of impious luxury:

> I will therefore that men pray everywhere, lifting up holy hands, without wrath or doubting.
>
> In like manner also, that women adorn themselves in modest apparel, with shamefacedness and sobriety; not with broidered hair, or gold, or pearls, or costly array.

The following are all the voice of John in Revelations, whether inveighing against the evil of this world or looking towards the glory of the life to come;

> So he carried me away in the spirit into the wilderness: and I saw a woman sit upon a scarlet-coloured beast, full of names of blasphemy, having seven heads and ten horns.
>
> And the woman was arrayed in purple, and scarlet colour, and decked with gold and precious stones and pearls, having a golden cup in her hands full of abominations.

The Fall of Babylon he clearly forsees, in all its demoralization and sorrow:

> And the merchants of the earth shall weep and mourn over her; for no man buyeth their merchandise any more:
>
> The merchandise of gold, and silver, and precious stones, and of pearls.

A direct mention of jacinth, or hyacinth, the lyncurium of Theophrastus, the ligure of the High Priest's Breastplate, the zircon of to-day is in another chapter of Revelations:

> I saw the horses in the vision, and them that sat on them having breastplates of fire, and of jacinth, and brimstone.

John's vision of the Throne of God runs along the same lines, the most valued of material things seeming all too inadequate to keep pace with the splendor of his dream:

> And he that sat was to look upon like a jasper and a sardine stone: and there was a rainbow round about the throne, in sight like unto an emerald.

Concerning the Heavenly Jerusalem, he who was first in Jesus' affections, to whom lovely things evidently appealed despite his fierce zeal for The Cause, lets his imagination run riot; even if, as with some of the older prophets, the list of wonders at last becomes a bit categorical:

> And the building of the wall of it was of jasper: and the city was of pure gold, like unto clear glass.
>
> And the foundations of the wall were garnished with all manner of precious stones. The first foundation was jasper; the second sapphire; the third, a chalcedony; the fourth, an emerald.
>
> The fifth, sardonyx; the sixth, sardius; the seventh, chrysolite; the eighth, beryl; the ninth, a topaz; the tenth, a chrysoprase; the eleventh, a jacinth; the twelfth, an amethyst.
>
> And the twelve gates were twelve pearls; every several gate was of one pearl: and the street of the city was of pure gold, as it were transparent glass.

One draws a long breath. Luxury can go no farther. This is surely the apotheosis of gems. Strange, how gold and opaque jasper in his ecstatic moods seem like the clearest of crystal to St. John the Divine; he who was to live to a great age, when the sky would be gray and the air chill, and all that burning enthusiasm, clashing with the hostility of unconquerable materialism, the eternal struggle for precedence here and now, must necessarily become a very different thing from the bright weapon of the youth who could not conceive failure—whose heart ached to vindicate his Master and save the World.

Before such radiant vision, such sublime faith, the modern is without words; words to express his wonder and his awe. How near, how very near, was each one of these chosen men, whether of the Old or the New Testament, to his God. Will this mental state ever come again?

In the distracted world of to-day, the quick answer may be "No." Yet what once was, can be; and in reaction from barren complexity, from doubt and fear, from greed, falsehood and shame, it does seem at times that the "open" if not the "simple" mind will come again and Truth prevail.

FAMOUS JEWELS.

The finding of the Cullinan or Premier diamond, in the Premier mine of the Transvaal Colony, South Africa, on June 25, 1905, was the mineral sensation of the twentieth century, and in a sense of all centuries. It was not only the largest diamond the earth had ever given forth, 3034 5/8 international karats, but is was of the finest blue-white tint and practically flawless.

What that find must have meant to Frederick Wells, the surface manager, making his daily rounds, towards evening, only he can tell. His eye running along the site of a deep excavation suddenly caught the gleam of something flashing high on the bank. Climbing up, he first tried to pull it out with his fingers, then broke a knife blade in the process, by which time he realized he had hold of a very large stone. It was so large that he began to doubt that the object really was a diamond. He said himself: "When I took a good look at the stone stuck there in the pit, it suddenly flashed across me that I had gone insane—that the whole thing was imaginary. I *knew* it could not be a diamond."

Nevertheless, he rubbed the dirt off, tested the stone, pried it out with another blade of his knife and carried it to the office in triumph. It was not long before the telegraph flashed the news to all parts of the globe, and a little later Mr. Wells received a present of $10,000 from the company.

After two years, nobody applying for personal possession of such an immense stone, it was decided to present it to King Edward, to be held forever among the crown jewels.

In the rough, it was said to look like nothing so much as an ordinary piece of ice. Large unpolished stones have no beauty whatever.

The cutting of the diamond, as described by Dr. Kunz in "The Century," June, 1909, was a dramatic event in itself: an important moment in the life of several human beings—Joseph Asscher, of the firm of Asscher Brothers, Amsterdam, who cut it with the skill and accuracy of a great artisan; Henri Koe, to whom the polishing was entrusted, and the King of England, to whom it was presented, by the Transvaal Government, in recognition of the grant of autonomy by the English Government. The consideration is believed to be $750,000, three-fifths of that representing the legal tribute from the diamond mines to the Colonial treasury, the other two-fifths paid to the mine owners in cash. It was decided to divide the stone into three almost equal parts. The cutting was begun on Feb. 10, 1908, but not till the end of October was the work completed on the largest section alone. While the cutting nowadays, with the improved methods, is both swift and sure, the polishing of so hard a substance is a very slow process, though much more rapid than half a century

ago. When finished, the largest piece, a drop briolette, was found to weight 516½ karats, and was given 74 facets, too little, some think, to bring out its full beauty; the second, a square English cut brilliant, 309 3/16, with 66 facets; the third furnishing several gems, varying all the way from 92 to the most minute. Although the cutting of this wonder was a good advertisement for the firm, Asscher Brothers are said to have lost money by it.

The larger jewels were mounted by the court jeweler so they can be worn either in the crown of the King on state occasions or as a necklace by the Queen.

Previous to the Cullinan, the largest diamond in the world was the Excelsior, found June 30, 1893, in the Jagersfontein mine. Orange River Colony, under the control of the De Beers Company, by a native, who received $750, a horse, saddle and bridle, equal to a home and business in Kaffir circles. This weighed 971 karats in the rough, was the shape of a broken icicle, and of the coveted blue-white. It was kept for twelve years, with the hope that it would be purchased entire, but no buyer forthcoming was broken up. The same cutter, Henri Koe, and the same firm, Asscher Brothers, managed this.

At the critical moment the cleaver struck fourteen blows before the diamond parted. "The owners were anxious as to the outcome," says the spectator, "and some of them had drops of perspiration on their brows as big as peas. The cleaver was as cool as if he were cutting an apple, knowing that if the crystal parted, it would be only where he wished."

The Cullinan is evidently, according to the best authorities, broken off from perhaps a still larger piece, the stone at the breakage showing evidences of internal strain, but the Excelsior, supposed to be of the same construction, has been proved to be complete. It is an interesting question whether the other half of the Cullinan may not sometime be found. Think of a diamond weighing 7,000 karats!

The famous Braganza of Portugal turning out to be a white topaz, these two South African stones, are undoubtedly the world's greatest diamonds; but there are a number of others, by no means small, which have played a part in history, and are talked about to this day.

Such is the Great Mogul, seen by Tavernier in 1665, who says it was found near Golconda in the middle of the seventeenth century. It weighed 787½ karats in the rough.

What became of this is unknown, unless it may be re-incarnated, as some high authorities believe, in the Orloff and the Kohinoor. With the authentic testimony of relative weights and dates, this seems highly probable, if not proved. The upper part of the Great Mogul is almost precisely like the Orloff in shape, size and weight, while the Kohinoor as it came to the English might easily have been cut from the bottom. It was seen by Tavernier after cutting, when he says it weighed 279 9/16 karats, though late writers have disputed this, because of the variations at that time between the Oriental and European measures. Cattelle is strongly of the opinion that the Orloff

and the Great Mogul are identical, and that the Kohinoor was a large cleavage from the same crystal, taken when the cutter reduced it about five hundred karats by simply faceting it to a high-domed rose. "This theory," he says, "would reasonably account for the unnecessary loss of weights and the confusion of traditions which in varying proportions have been attached alike to both stones."

In 1739 Nadir Shah, formerly King of Persia, carried off the treasures of Delhi, the "Great Mogul" among them, to Khorassan. After that nothing is positively known about this gem. In 1747 Nadir Shah was assassinated.

The Orloff, without history, but heavy with fables, appeared on the scene at Amsterdam, in 1791, when it was sold to Count Orloff, for Catherine II, and has ever since, in the sceptre of the Czar, been the brightest ornament among the jewels of the Russian crown. In the effort to create human interest in gems, this diamond has been referred to as a gift to Catherine from Gregorio Orloff, then in disfavor with his royal mistress, and ever seeking reconciliation and reinstatement. It is stated with some humor that she "inserted it firmly in her sceptre" and left the giver to wander in outer darkness till he went mad and died. Sordid as Catherine might be, she was not quite like that. It is true that Gregory died mentally disjointed, never regaining the place he once held in the Empress' regard. Why should he, when not once but thrice he had been both politically indiscreet and flagrantly unfaithful? But his death occurred in 1783, eight years before the transaction of the diamond, when Alexis Orloff, brother of Gregory and Admiral of her fleet, bought it for the Empress as agent. Besides, Catherine was sixty-seven at this time, five years before her death, and her faith in jewels was likely stronger than in men.

The history of the Kohinoor is more clear. From the time in 1739, when it was wrested from Aurungzebe by Nadir Shah in the sack of Delhi and carried off to Persia, until its final presentation to Queen Victoria on July 3, 1850, it had been attended by every sort of trouble and violence. The Hindoos have a firm belief that the Kohinoor brings certain ruin to the person or dynasty possessing it. After its presentation to Victoria, England nearly lost India, and when the recent troubles came up many a superstitious Briton trembled in his shoes. As far back as 1860, a man of the finest intelligence wrote: "Within ten years it has brought about the all but total loss of India to the British crown, in which beams its malignant lustre, lighting up a very inauspicious future for that region, fated apparently ever to be disturbed by the measures of ignorant zealots at home and the plots of discontented and over-powerful allies in the country itself."

The Kohinoor when brought from the East weighed 186½ karats; after recutting, 106¼. It is an impressive stone, but not of the first color or quality. The Orloff weighs 193¾ karats, and is fine, clean and very brilliant. Could the lower half of a gem be of a different quality from the upper half? If not, this rather disturbs the theory about the Great Mogul.

When the Orloff was sold to Russia in 1791, it brought a million Dutch guldens, or $400,000. The beautiful Hope diamond, of a perfect sapphire blue color, one of the rarest of gems, when sold at auction in Paris, 1909, brought only $85,000, almost exactly what it cost Henry Thomas Hope, a London banker, in 1830. This seems incredibly low for so remarkable a stone, weighing 44⅜ karats, and of an incomparable hue. One of this color was brought by Tavernier from India in the sixties of the seventeenth century for Louis XIV. of France. After cutting, it weighed 67⅛ karats. This, with others, was stolen from the French crown jewels amidst the horrors of the Revolution and never found. Still, a drop-shaped stone of the same color from the Duke of Brunswick's collection was sold at Geneva in 1874 for $3,400, while Edwin W. Streeter, the jeweler of London, independently bought a karat of precisely the same shade for $1,500. Allowing for the loss of weight in recutting, it seems almost certain that these three stones represent the larger one purchased by the Grand Monarch more than two centuries ago.

The banker Hope, when it came into his hands, apparently without history, through a London dealer in 1830, paid for the stone which bears his name $87,000. He gave it to his daughter, when she married the Duke of Newcastle, and she in turn presented it to her second son, Lord Francis Hope, who, after a wild career, became involved with May Yohe and married her in 1894. After the divorce in 1901 Lord Francis, to satisfy creditors, sold the diamond for $168,000, it was said, to Simon Frankel, who tried to dispose of it in 1907, when the firm of Frankel Sons & Co. got into financial difficulties. It was bought by Selim Habib, who said the price was $400,000, but he too became embarrassed and offered it for sale at auction in Paris, June, 1908, subsequently withdrawing it and selling it at last to a jeweler named Rosenau, of 9 Rue Chauchat, in whose possession it was in November, 1909, though reported as lost with Selim Habib on the French mail steamship off Singapore.

On a grand occasion, February 19, 1715, six months before his death, Louis XIV., while giving audience to the Persian Ambassador, appeared in a black suit embroidered in gold and ornamented by a kingdom's worth of brilliants, with a dark blue diamond suspended from a light blue ribbon about his neck. It was a fixed belief with Edwin W. Streeter, the well-known English jeweler, that this and the blue stone stolen in 1792 with the rest of the French regalia from the Garde Meuble were the same. In his book on "Precious Stones" (published exactly one century after the theft) he devotes four pages and a colored illustration to a convincing argument that this royal jewel lives again in the Hope, the Brunswick, and a one-karat stone owned by himself; that these are the Louis XIV. blue diamond split into three parts, so that the thief, perhaps one of high Revolutionary degree, could not be traced. That the color and weight, allowing for the loss of recutting, are almost identical, renders this hypothesis not improbable. At this moment the unique and hapless Hope peacefully reposes on the fair shoulders of an American connoisseur

in gems—Mrs. Edward B. McLean of Washington—the insurance on whose treasures is said to be $3,000,000.

One of the finest of diamonds, absolutely limpid and as broad as it is deep, is the Regent, or Pitt. It also was stolen from France in 1792, but was restored and is still among the French Crown jewels, on exhibition in the Louvre. It is an Indian stone, found about 1700, brought to Europe, and sold to the Duke of Orleans, Regent during the minority of Louis XV., in 1717. The great Napoleon wore it in the hilt of his sword, and later used it as a means of raising money from Holland. Only recently has the jewel been redeemed. It was called the "Pitt" before the "Regent" from Gov. Pitt, of Fort St. George, Madras, grandfather of the future Earl of Chatham, who bought it for something over $100,000, sold it to the Regent for quadruple, and in 1791, after recutting in London, though reduced from 410 to 136⅞ karats, it was valued at $2,400,000. To such an extent does the price of a rare gem, the Hope diamond excepted, increase. After various vicissitudes, it is now quietly resting in an art gallery, gazed at by thousands of the gaping throng whose ancestors, up to their strange carnival of joy, knew its wonder only by hearsay.

Sancy seems to be a name to conjure with. It has been applied to various stones, with considerable resulting confusion, in the number of legends attached. But the real "Sancy" was cut for Charles the Bold, Duke of Burgundy, the last of the feudal lords to resist the power of the French monarchy. It was found by a soldier on his body after the battle of Nancy and carried to Portugal, sold by the King of Portugal to a Frenchman, Baron Sanci, and by him sold to Elizabeth of England. Upon the execution of Charles I., it was pawned by his widow Henrietta, seeking shelter in France, to Cardinal Mazarin, who so valiantly fostered the infant art of diamond cutting, and by him bequeathed to Louis XIV. At his own coronation, it was worn by Louis XV. With others it was stolen from France in 1792, that halcyon time of thieves, when it was a crime to be a gentleman. Ten years later, it turned up among the Spanish Crown jewels. From 1828 to 1865 it belonged to Prince Demidoff, by whom it was sold for $100,000. It was exhibited at the Paris Exposition in 1867. Then it went back to India, not only once but twice, via Paris, that clearing house of priceless treasures. Its wanderings are ended for the present, so it is said, through the agency of William Waldorf Astor, who purchased it in London for his son's bride. But much is uncertain about this stone, because of its many namesakes. The original "Sancy" weighed 53¾ karats, and may be wandering yet. It is said to be the first diamond cut in Europe.

The Polar Star, a stone of great purity, weighing forty karats, and once the property of the Emperor Paul, now belongs to the Princess Yassopouff.

In Persia, two superb stones of rose cut, each between one and two hundred karats, bear poetic titles for which the English equivalents are "Sea of Light" and "Crown of the Moon."

The Florentine belongs to the Emperor of Austria. It is of a

beautiful lemon color, cut to a double rose. This diamond also is said to have been owned by Charles the Bold and lost by him in battle. About all legends cling, but few are well authenticated. The Florentine weighs 133⅓ karats.

Another Russian Crown jewel, often confounded with the Orloff, weighs 120 karats. It was purchased by Catherine II. of an Armenian, in 1774, for 450,000 rubles, a life pension of 4,000 rubles, and a patent of nobility. This stone once belonged to a Shah of Persia, and is said to be flawless and the size of a pigeon's egg.

The Nassak, held for a long time in the temple of Nassak, and stolen by a French deserter, was sold through Emanuel, the English jeweler, about 1832, to the Marquis of Westminster for $36,000, and is still with that family. It weighed, after recutting, 79⅝ karats.

The Eugenie is a fine brilliant of unknown origin, presented by Catherine II. to her favorite, the despicable Potemkin. It was bought from his descendants by Napoleon III. for the Empress. It is now owned by the Gaikwar of Baroda.

The Dresden Green Diamond is fine and flawless. Its color is said to be light, though—that of a green beryl. It has been owned by Saxony since 1753, and is now in the Green Vaults at Dresden. Augustus the Strong, who had a fancy for jewels rather unusual in a manly Teuton, and who owned the White Saxon Brilliant, one of the finest known, paid $45,000 for the Dresden Green. Its weight is disputed, but is given by Max Bauer, who ought to know, as forty karats.

A fine green, the finest ever found, like a brilliant emerald, but small, slightly over a karat, was bought in 1860 for $1,000, sold some years later by Mr. Streeter for $1,500, and later still was disposed of in New York for $7,000.

The Halphen Red was obtained by the same jeweler at about the same time for $4,000. It was a ruby red and, despite rumors as to such in the Russian and Austrian Imperial treasuries, is the sole authentic specimen of any deeper tint than pale rose known to the world. It is called "a gem on fire," haunting the public, yet never to be gazed upon—for it has passed into the oblivion of private ownership.

The Star of the South was found in the western part of Minas Geraes, Brazil, July, 1853. It was cut to a brilliant of 125½ karats and sold to the Gaikwar of Baroda for $400,000. It is the largest diamond produced by Brazil.

The Star of South Africa was the first large diamond found at the Cape, in 1869. It is a river stone, and equal in quality to those of India and Brazil. It was sold to the Countess of Dudley and is known as the "Dudley Diamond." It weighed after cutting 46½ karats.

Dr. Kunz in his "American Gems" says there are three diamonds owned in the United States weighing 55¼, 77 and 125⅜ karats, the last the Tiffany diamond, the handsomest yellow known.

Four of the ten Mazarins of the French Crown jewels, are owned in the United States, and a brilliant of the luxurious Catharine

of Russia. Besides these diamonds there are privately owned in our country a ruby weighing 9⅜ karats, worth over $33,000, several valued at more than $10,000, an emerald at $12,000 and pearls galore. Several families possess jewels ranking in perfection above royal collections. None, however, can vie with the latter in historic interest.

The list of well-known colored stones is not as long as the diamonds, which includes, perhaps, a dozen more than are mentioned here.

There are few famous rubies known to Europeans. The appreciative Catherine received one, from Gustavus III. of Sweden, the size of a pigeon's egg, when he visited Russia in 1777. It was cut en cabochon, which is almost a confession of marked imperfections, and had "Thelk Lephy" engraved on one end.

Rudolph II. of Germany had one the size of a hen's egg, valued at 60,000 ducats.

There is mention of two or three immense rubies, weighing from one to two thousand karats, but these were not fully transparent.

The two best known in Europe were sold to private parties in 1875, after being recut to thirty-two and thirty-eight karats. If it had not been for political troubles in Burmah, the Occident would never have had an opportunity to acquire them, says Cattelle. They are gems of great beauty.

The Black Prince Ruby in the Imperial crown, Tower of London, is simply a spinel—more valuable for its story than anything else. It is not every day that one may look on an object worn by a King of England in his helmet at the battle of Agincourt. This was an Indian stone, cut en cabochon, and presented to the Black Prince by the King of Castile.

Cat's-eyes of large size have been sold in recent years, but to private parties, one of golden brown, with a remarkably distinct ray, for a stone of 80¾ karats, finding a purchaser in the United States.

Perhaps the largest and finest emerald ever discovered is owned by the Duke of Devonshire. It weighs 1350 karats, and is of fine color, clean, transparent, but uncut.

In the Hope collection, there was a large sapphire which appeared as well by night as by day, a very rare characteristic in this stone, so liable to turn almost black by artificial light.

The sapphire set in the cross surmounting the Crown of England is the only stone left from the priceless jewels once in the Chapel of the Pyx, in Westminster Abbey, held safely there up to 1303, during all the wars which racked England to the fourteenth century, yet stolen at last not by the enemy, but by the Men of God themselves—the Sub-Prior of Westminster and a Sacristan, who ferried the treasure, never to be seen again, across the Thames. That the sapphire in the English Crown has survived is due to the fact that at the time of the robbery it was in Edward the Confessor's own tomb, set in a ring on his dead hand. It, too, went through various adventures, but finally was left as a legacy to George III. by the Cardinal of York, and is the sole remaining relic, in the way of personal adornment, of England's earliest monarchies.

DIAMOND.

When the coal in the grate warms us, the gem on our hand responds to its glow. One is the gift of the dim past to our necessities; the other represents the height of modern luxury. Yet both are chemically the same.

These ancient buried forests which protect us from the cold are largely composed of carbon. Every breath we expel is full of carbon. It is an elemental substance without which we would die. Yet in its crystallized form, it is as rare as the diamond. In fact, it *is* the diamond. The diamond is pure carbon.

All great things are simple: air, water, fire; sunset and moonrise; the night and the dawn; our five senses; birth and death.

Diamond is the poem of the inorganic world: still, it is nothing but carbon; not another thing enters into its composition; while tourmaline, a bushel of which would not buy the Kohinoor, is infinitely complex.

Though the composition of the diamond is absolutely simple, yet it defies explanation, it is the despair of science. No chemist can make one, no mineralogist can tell how it is made. Here even the learned must resort to generalities. Though heat and pressure and time have much to do with its crystalline form, what does that mean? What is the magic that enables a dull substance once in a thousand years to blossom like the rose?

The stolid Boer boys played long with bright pebbles before the genius came and directed capital to buy the farm. Then the whole world bought. To us, here at home, it is a miracle. Yet as the diamond itself is the simplest of things, so great deeds are rooted in single instincts of the heart. The youth craves adventure, the adult a living, the financier a fortune, the slave his freedom, the explorer the realization of his dream, and all combined turn the world inside out: the Pole is found, earth's treasures are disclosed and men and women grow in wealth, elegance and power.

A man longs for the open, starts out with more zeal than money, trudges over a barren land, nearly dies of fatigue, hunger and thirst, falls fainting before a humble cabin, picks up a souvenir, and the result is—the De Beers Consolidated, fortune upon fortune, and at last the scintillating parterre at the Opera!

The pioneer may not share in this. Yet he has had his compensation. He has broken the chains of custom. He has made fertile the waste places of the earth. To the explorer comes a joy but dimly perceived by him who merely profits thereby. He must be shaken by an emotion akin to Creation—the remembrance of which will follow him to the end of his days.

But for these invaders of the desert, these conquerors of the peaks, the undaunted soul who reached the Pole, we might be wrangling like wild beasts to obtain a foothold on the earth. One with the Universe, a part of the divine plan, a part of the divine power, they lead the way.

No herald is needed to proclaim the dignity and power of the diamond. Like the King, its rank is beyond dispute. Not only is the diamond the hardest of precious stones, but of all substances known. This, together with its wonderful prismatic play, reaching its highest expression in modern cutting, makes it one of the most coveted objects on earth. The humblest East Side Polish Jew, who puts his money into it rather than the savings bank, perhaps pays to this monarch the highest tribute of all.

There is no stone more wonderful, more alive. What endless charm in its various phases; its grasp of all colors; its elusive, emotional, agitated beauty! Its fascinations hold in thrall rich and poor, old and young, lady and laborer alike. A plain, practical jeweler writes thus:

> Nothing in art or nature excites more admiration and desire; few things appeal so forcibly to the common human love of the beautiful. The qualities which make precious stones so desirable are beauty and durability combined. The limpid sparkling dew-drop is beautiful, but while the sun's rays beautify, they devour it. The beauty of the diamond is the same, only it will tremble under the ardent glances of the sun and flash its answers back for a thousand years.

If you feel the mystery of the rainbow, you are drawn by the diamond. If you thrill with the wonder of the fresh young morning, frost-work or shower, you love the diamond. If your soul melts with the eloquence of star upon star, you have perceived the divinity that lies at the outermost circle of the universe not less than the centre of life.

Of late years, diamonds if bought "right," as the saying is, have proved conservative investments, the value going up by leaps and bounds, and so far showing no backward tendency. This is due not only to their almost exclusive control by a shrewd and powerful syndicate, but also to the fact that, with no new mines in sight, and the old yielding a lesser quantity each year, there is the possibility in the near future of a real scarcity, at least in those of the first quality.

While something of an output comes from Australia, a limited deposit of black, colored and flawed white from Borneo, here and there one is picked up in the United States, there are only three important sources of supply—India, Brazil and South Africa. Long was India, certainly up to the sixteenth century, the diamond's exclusive home. The famous mines of Golconda, near Hyderabad, though the actual deposits were some distance away, Golconda itself being merely the trade centre, produced stones of the finest quality. In spite of unskillful lapidaries, always cutting for weight rather than brilliance, these were the wonder of the world. Shafts were sunk sixty or seventy feet, then the work was done entirely by *hand;* digging, baling out the water, extracting the gems from the earth, some-

times thirty thousand laborers being employed. Very large stones were then as now extremely rare, but many were obtained from ten to fifteen karats in weight, though by far the largest number were minute. The works were stopped in 1532, for reasons not clear, some say because the Great Mogul demanded from the King of Golconda an enormous tribute, but the best authorities believe because the mines were exhausted.

During the early part of the eighteenth century, two hundred years after the discovery of Brazil, diamonds began to come thence to Europe almost equal in quality to the Indian, but whose habitat at first was doubted and value decried by European merchants fearful of an oversupply. This induced the clever Portuguese to send them to India, whence they were reshipped by confederates at Goa as true Indian stones. The Brazilian mines of Minas Geraes were opened in 1727, and from then till 1850 were computed to have yielded to the world at least thirty million karats, of which, however, only one-third were fit for gems.

A few years later the most extraordinary deposits, so far as quantity goes, in all history were discovered—those of South Africa. When these began to be mined scientifically, the output was so tremendous that Brazil could not stand the competition, and her diggings practically ceased, while the price of diamonds greatly declined. Then a syndicate was formed, called the De Beers Consolidated, the mines were placed under one management, the output was restricted and the price regulated. Diamonds are not as thick as pebbles and the end is bound to come. Perhaps, when the earth's possibilities are definitely determined, the diamond will once more be the property of kings only, or their substitute in the world's economy—the American multi-millionaires.

Since 1875 the South African mines have been the main source of supply. They now furnish 95 per cent. of the world's output. As a rule, these are tinged with yellow, but at Jagersfontein, large pure white stones, some bordering on the desired bluish cast, are not uncommon. These are called Jagers (Yahgers) in trade, and their whiteness is supposed to be due to the complete absence of iron pyrites. Yet though white, they are subject to defects. Few are perfect.

The gem, or "gem color," is that which expresses the beauty of the specimen at its highest development. As the normal diamond is without color, the "gem" diamond technically is the one of the purest white, the clearest transparence, and the greatest brilliance. It is highly desirable to own such a gem; the first rank in this stone means more than in others; it is economy to invest in the best. One of defective properties may possess a charm endearing it to you personally, but the dealer has a profound respect for what he calls "good stuff," white, clean, perfect, and he will seldom let it pass.

With colored stones, it is not quite the same, perfection of tint being the first requisite. A ruby of the true pigeon's blood, though flawed, is to be preferred to a stone of doubtful hue, no matter how clean. This deep, vibrant, glorious red magnetizes the minute it

appears. As Cattelle says: "Gem color is at once recognized by those who have seen it before, and usually the uninformed will prefer it above all others, simply on its merits. The true shade in all gems is that degree of natural color most pleasing to the eye. It should affect the sense of sight as silk velvet feels to the touch—rich and soft. No gem color is harsh or thin or watery."

As color enters a diamond, beyond a slight tinge, it becomes more rare but less brilliant. The refractive and dispersive powers, exceptionally strong in this stone, seem impeded by any noticeable admixture of pigment. The brown diamond, usually seal or bronze, has little prism play, while black has none at all. Yet with its lesser brilliance, the brown even in its deepest tints is not without richness, and always exhibits a restlessness, an energy, possessed by no other brown stone.

Diamonds strongly tinged with color are termed "fancy" stones, and command their price. Once in a blue moon there is one with color so pronounced as closely to resemble the gem it mimics. The Hope Diamond is like a fine blue sapphire. A ruby red diamond of ten karats is said to be among the Russian Crown jewels, and a rose red of three times that size among the Austrian, but no one seems actually to have seen these two red diamonds. The Halphen Red, described under the head of Famous Jewels, is authentic, as is the celebrated Dresden Green, in the Green Vaults at Dresden. Tiffany has one of a yellow so intense as to mock the topaz.

But these are the wonders of the world. Generally the coloring of fancy diamonds is very pale, seldom more than a slight tinge of blue, pink, green, violet or yellow; but whatever the tint, whether suggesting the sapphire, ruby, emerald, amethyst or topaz, it is by reason of its prismatic play more beautiful than any stone it recalls. To the King they all bend the knee!

Diamonds combining absence of color with perfect transparence have a peculiar steel blue appearance. These are the blue-white —the finest known to the trade. They head the commercial list, though the pure white are more actively in demand, the blue-white being less effective in the evening than by daylight. Some of these stones, rather dull by gas-light, the arc light converts into a deep violet, almost uncanny in its loveliness. If brought directly into a dark room, after exposure to the sun, these often exhibit phosphorescence. This is a characteristic of some of the Old Mine stones, a term nowadays applied not only to the actual output of the Old Mine in Brazil, but to all diamonds of the mediaeval square cut.

The blue-white gem was not of great rarity among Indian or Brazilian stones, but is far less frequent in South Africa. Diamonds from the Cape differ again from the Indian and Brazilian in exhibiting a finer play of colors by artificial than natural light. Gaslight is always the friend of yellowish stones, taking the despised tint out of them, and increasing their lustre, but as a rule only deadening the blue.

Many diamonds change color with heat, but the South African, if yellow, remain so at the highest temperatures. Can this be because,

with the blue earth in which they are formed, they are the result of volcanic action? The Indian and Brazilian are found mostly as rolled pebbles, brought far from the mother rock by the force of torrents and rushing water.

Dr. Kunz reckons that, according to the high American standard, only eight per cent. of the Cape output is first quality; twenty-five per cent. second; twenty per cent. third; and the balance "bort," an imperfectly crystallized form, used for mechanical purposes. Carbonado, found largely in Brazil, is a brownish-black variety, very indistinctly crystallized and without brilliance.

The American commercial scale is white, pearl white, steel white, commercial white, Cape white, the last four increasing shades of "off" color, then deepening tones of yellow; but a "canary," at its best precisely the tint of the bird, is a fancy stone, and as such is more valuable than a pure white.

After the yellows come "London Smoke," and the various shades of brown, first barely tinged, then gradually down through increasing coffee tints to mud. There is a well-defined value for each of these gradations, and also for brilliance through the various defects to the thickest impurity. A karat stone, white, flawless, but without a hint of blue, at the present time costs the public quite a bit over $200. As the karats increase, the price mounts much faster than the karats.

But flawlessness, while to be desired, does not necessarily contain all the virtues. Less perfect stones, though defective, may possess a greater value and charm. Cattelle says: "It is necessary, above all things, that a stone, of whatever kind, have some positive merit. There are stones, like men, whose qualities are all negative; they have no striking faults even; they do not impress one. Avoid them. Others are faulty, but somehow one likes them. They have character. A crystallized dew-drop that holds the play of the sun will have more lovers, though there is a black spot in the heart of it, than a dead stone which barely winks at high noon, even if 'perfect.'"

Very large stones, though scarce and expensive, are stupendous rather than beautiful, valuable only as curiosities. The fire does not increase after a dozen karats in proportion to the size. Great diamonds often impress the beholder scarcely more than so much glass.

The black diamonds of Borneo, the hardest of all, must be polished by their own powder. They are more strange than beautiful, being practically opaque, light only along the edges. Yet their very opacity gives them a certain interest, and they make ideal mourning jewelry. Australia, the home of the black opal, recently given to the market, produces as yet no black diamonds, though the small white ones found, the largest not exceeding five karats, are next in hardness to Borneo's, and cut very brilliant. Black diamonds occur near Bahia in Brazil, but the main output there is carbonado—of great use where an irresistible substance is required, but not appropriate for jewelry.

In Brazil, particularly at Diamontina, Minas Geraes, there are stones of a greenish cast which sometimes proves superficial and a

white diamond results from further cutting. Since the rise in price, there is renewed interest in Brazilian mines, American capital being more and more invested; but as the country is wild, reached only, much of it, by mule back, the progress is slow. It is said, too, that so far the diamonds run small and defective.

Diamonds, as well as colored gems, cost more in older civilizations than ours. But in 1824, when Don Pedro paid to England the Brazilian debt in diamonds, there was a glut in the market and the price fell. In 1836 it rose again. During the revolution of 1848 it fell. From that year till 1865 it increased about five per cent. yearly. Then, at the end of the American Civil War, it sprang up twenty-five per cent. At the end of the Franco-Prussian war of 1871 it rose ten per cent, next two years twenty per cent. After the American panic of 1873, and discovery of South African mines, the market price fell steadily to that of 1862. The South African abundance affected the yellowish stones far more than the pure white. Yet even they have almost doubled in value since the beginning of the twentieth century.

The diamond, being the hardest of all gems, is marked 10 in Moh's scale, an arbitrary method of comparing stones, invented by a German. The outer skin of the gem is harder than the interior. But though hard and fairly heavy, its lustre adamantine and specific gravity 3.5, it is by no means infrangible. The old superstition that the diamond if placed between hammer and anvil would go through the ordeal unharmed probably has caused the destruction of many a fine stone. Such credulity received a rude shock when modern mineralogists discovered that though hard it is brittle, owing to its perfect cleavage. It is well, then, not to drop an unset diamond from any height.

Dispersion, the power of breaking up white light, is great. The spectrum produced by a prism of diamond is very long; the red rays are widely separated from the blue. Thus the various colors a white diamond breaks up are each so far apart as to be distinctly perceptible. Hence that remarkable prismatic play on which the beauty of the gem depends. This is highest in the Indian, next in the Brazilian, lowest in the South African. Yet the finest of the last approach, perhaps equal, the beautiful blue-white of the others; and those without a tinge of blue, if flawless, often have a magnificent play, particularly when massed together. An ornament of this sort, where the tints leap from stone to stone, is a river of light and gorgeous fire.

Brown diamonds, more common than others, are nevertheless, because of the increasing cost of white, the prejudice against yellow, and a certain subdued charm of their own, becoming quite popular. Often, like the black, they are transparent only at the edges, and also like them, are frequently opaque. Generally, even in the lightest shades and most transparent specimens, they are less brilliant in play of color than yellowish stones, and appear to best advantage in the daytime. All colored specimens show up better by daylight. The brown are particularly appropriate as an accompaniment to hyacinths,

zircons, topazes, any stone containing brown, red or yellow, and also as a ring-stone, set deep in gold, for men.

As said before, the diamond, though the hardest of all substances, is brittle. This is because of its almost perfect cleavage, which makes it respond readily to a well-directed blow, and sometimes become injured in a fall. While a skillful cutter with modern tools is almost sure of the result, at the same time such an important moment must be a trial to the nerves. Yet so accurate has the work and the mathematics concerning it become, that the lapidary can foretell to a certainty the exact shape, size and appearance a rough diamond after cutting will assume.

When the polishing is to take place, the diamond is placed in a special box, or "dop," about two inches long, filled with a fused lead compound in which the gem is imbedded. This weighs about half a pound, and holds the stone firmly in position. Then the polishing wheel, generally with a diameter of about ten inches, makes some 2,400 revolutions a minute, and the work is begun. Often it must be interrupted to allow the disk to cool, when overheated by friction. Each time a new facet is cut, the diamond must be removed from the dop and reset at a new angle. The diamond-cutter trusts to his eye alone to guide him in this delicate adjustment, except in the case of very small diamonds, when a lens is necessary. The skill shown in placing the stone in the heated metal, sometimes with the bare hand, is said to be remarkable.

The "brilliant," for which cut every one nowadays yearns, resembles two cones united at their bases, the upper truncated a short distance from the base, the lower having the apex removed. The flat top is called the "table"; the rim, where the cones unite, the "girdle"; the small flat bottom, the "culet"; the entire lower portion from the girdle to the culet the "pavilion"; and the space between the girdle and the table the "bizel" or crown. Formerly, one-third of the depth of the stone was placed above the girdle. It is less now, and the change is for the better, giving to a stone of less weight a sharper brilliance.

As a rule, there are thirty-two facets above the girdle and twenty-four below; in all fifty-six, not counting the table and the culet. To these are often added eight extra facets, both above and below, each recut into three or four smaller ones.

It is not difficult to tell if a stone is cut to the best proportion. If when held both near and far, it seems full of light and life, it has fulfilled its destiny. Too deep a stone, or one cut irregularly, perhaps to avoid a flaw, sometimes with the culet slightly to one side, will often have a dark spot or "well" in the centre. While if cut too shallow, there will be a glassy appearance, like the eye of a fish, which is wholly undesirable. This latter quality is apt to be a drawback to the present very general tendency to cut stones "spread."

The "twentieth-century cut," introduced a few years ago, but falling short of popular approval, is simply the old double rose with a modern twist. It is well enough for a shallow stone, but fails to bring out the possibilities of the best specimens; seeming to be all surface,

lacking in reserve power. One of the chief pleasures of the diamond owner is to look into its beautiful, mysterious depths, from which flash all the colors that ever were. This can never happen with the twentieth century cut, or "fish-eyes." The rose-cut is usually confined to either very small or very large stones. Thin diamonds and chips must be rose-cut. And it was also considered best for the big Florentine.

The briolette is an oval or pear-shaped stone, cut in every part with triangular facets; the pendeloque is the same, cut brilliant; the rondelle is a flat, circular stone with faceted edges.

Step-cut is that in which you often see the emerald, and many colored stones from the Orient. It usually has three rows of straight facets parallel to the face of the stone, decreasing in length as they approach the table; sometimes six-sided, sometimes eight. The lower part is covered with similar facets to the culet. Lately the upper portion has sometimes been cut brilliant, but not all approve of this, though it increases the lustre.

Cabochon-cut is flat with a polished convex top, as with opals, turquoises, moonstones and the dark garnet, or carbuncle. Other gems may be cut this way, sometimes to great advantage, as it hides defects and softens the color. It is particularly appropriate to decorative gold work, harmonizing and uniting with the metal as no brilliant ever can, adding immensely to its richness and artistic effect.

The first diamonds found in India were valued most when they were changed least. A well-shaped natural crystal, slightly polished, sometimes with a facet here and there to catch the light, was to them the height of beauty. Even when facets became more common, though as a rule only around the edge of the stone, leaving the centre free, Tavernier said he could tell when a diamond was defective simply by the number of its facets. In those old times they were used that blemishes might be concealed rather than beauties revealed.

Two things the old cutters understood perfectly—to cut for weight, and to bring out the best tint of a colored stone. By placing the facets in exact relation to an ideal spot of color they could throw it around the whole stone, which then faced the spectator as a perfect specimen instead of one cleverly manipulated.

This sort of thing obtains at the present time, and Indian stones should never be recut without recourse to the highest authorities—they may easily turn out to be anything save examples of the coveted gem colors. It is difficult to eradicate from the Indian blood the reverence for mere weight; they care for it more than for anything else; it hurts an Oriental to sacrifice karats to brilliance as much as an old gentlewoman to offer up her lace heirlooms to the scissors of the irreverent up-to-date modiste.

It was in Europe, not India, that gem cutting received its first real encouragement. After a few tentative efforts, Louis de Bequem attempted in 1475 what was then considered the "perfect" cut, on three large diamonds owned by Charles the Bold, one of them the Sancy.

Bequem's pupils were encouraged greatly by Cardinal Mazarin, who ordered twelve of the largest diamonds in the French crown recut after the new fashion, about 1520.

Diamond cutting naturally was taken to by the Jews, whom religious persecution half a century later drove from various places to Amsterdam, where they flourish to this day. Amsterdam and Antwerp, the latter harboring all the French refugees during the political troubles of the eighteenth century, are now the diamond cutting centres. But the industry is making amazing strides in the United States.

It was here, indeed, that the brilliant cut reached its highest perfection, first at the hands of Henry D. Morse, of Boston, who conjured with some of the cheaper stones, making them rival in beauty others infinitely more costly; then by Mr. Passmore, also of Boston, who is doing for colored stones what his predecessor did for the diamond.

So extraordinary has been the progress in the transformation of ordinary transparent stones, such as garnets, peridots, zircons, to objects of great splendor, that it seems as though mechanical skill could go no farther.

All efforts to improve on a cut which, in its way, seems perfect have so far come to naught. The trouble is rather that everything is being thrown into the scale on the side of mere brilliance. Sometimes the glare wearies the eye. The beryl, for instance, has a softer, more eloquent tint when simply cut en cabochon. Defective rubies, allowed to assume this form, and set low in richly carved gold, often carry off the palm from their more perfect sisters poised in a high clawed setting and brilliant in a way that does not belong to this gem, unless endowed with rare natural fire.

The astonishing fact about a diamond is that its beauty is largely due to the bending of a line of light, not to its appearance as the Lord made it—scarcely more impressive, as King Edward remarked of the great Cullinan, when shown to him in the rough, than a glassy pebble kicked aside in the road.

From a curiosity this is converted into a thing of beauty by the skill of the cutter to catch the light and, by means of many facets, at exactly the right angle, every step calculated to a nicety, to send it back and forth, like battledore and shuttlecock, till wearied with the struggle it is allowed to rest at last in its lover's eye.

Mr. Morse's scientific study, aided by his artistic perception, enabled him to attain a perfection which not only brought the United States into a prominent position among diamond experts, but revolutionized the methods of the whole world. For he did away with much of the old hand labor, replacing it with a machine wonderful in its accuracy and speed. "Mr. Morse above all others," says one, "has shown that diamond cutting is an art, not *an industry*."

There is a lot of affectation in the talk about the vulgarity of diamonds. It is mostly from the lips of impecunious artistic temperaments, who could not own them if they would. Such a gem is not to be worn to market, but it is the height of beauty in its place. On a

negative little woman it is not in its place, nor on a big fat man. To a brunette it is exceedingly becoming, particularly if the sparkle in her eyes matches that of the gem. Even if a dull countenance be extinguished by flashing diamonds on neck or ears or hair, there may be a beautiful hand. Diamonds will lend charm to its color, call attention to its character, and there is no location which gives greater pleasure to the wearer.

It seems a fact that the diamond responds to a deep human instinct for life and light, despite the flings at it from those who wish to appear the possessors of superior taste. A Swedish maid, who had lived with me ten years, and been a tower of strength in time of trouble, received in course of her stay, several rings—a topaz, her birthstone; an amethyst, her guardian angel talisman; a carbuncle surrounded by pearls, an opal, a ruby doublet, and a diamond, the last a pure white dazzling gem of extraordinary fire, weighing a karat, and costing over $200. With these she went back to the old home in Sweden, where her relatives raved over the colored stones, particularly the topaz, the ruby doublet and the opal, but would have none of the diamond. They saw no beauty in it, and declined to believe it was valuable, though several New York jewelers had exclaimed at its exceptional quality and charm. And surely these good people, in the heart of a Scandinavian rural district, represent crude rather than cultivated taste.

Diamond is the birthstone for April and the talismanic gem of the guardian angel for August. It expresses purity and innocence.

Marbodus says:

> In magic rites employed, a potent charm,
> With force invincible it nerves the arm:
> Its power will chase far from the sleeping head
> The dream illusive and the goblin dread:
> Baffle the venom'd draught, fierce quarrels heal,
> Madness appease and stay the foeman's steel.

As a protection from poison, the diamond was much used in the remote past, and also for the detection of infidelity. Placed under the head of one sleeping, it compelled the disclosure of violations against the "first law of love."

RUBY.

Known under different names since the beginning of gem history, the ruby was not fully distinguished from other red stones, except by the learned few, until comparatively recent times. Not many even now understand that the ruby and the sapphire are identical—that the only difference is one of color. Both are the gem forms of corundum, the crystallization of a widespread and common thing in nature, the earth alumina, and the hardest substance known next to diamond. Emery is corundum in an amorphous state, the ancient "stone of Naxos," used for polishing. It is 9 in hardness, about 4 in specific gravity, and its lustre is vitreous.

Nowadays the dull, opaque, coarse crystals, unfit for gems, are referred to as corundum; the blue, green, yellow, pink, white, as sapphire, the red as ruby. Where the line is drawn that converts the light ruby into the pink sapphire it is difficult to describe; yet one much less than an expert generally can tell. There is a salmon tinge to the pink sapphire never found in the ruby, whose red inclines to violet. While rubies degenerate in color till they are exiled to the sapphire's realm, there is no doubt when the sad circumstance takes place. The ruby is much more like the spinel, the garnet, the tourmaline, than its own faded pink sister. Sometimes it is exceedingly difficult, by the color alone, to distinguish a fine tourmaline from a ruby.

Yet there is a depth and at night a vivid brilliance which explains why the ruby is the peer of all colored stones. Particularly is this the case with that called the "pigeon's blood," said to be the exact shade of the blood of a pigeon dropped on white paper. A very small pigeon's blood placed beside other red stones, no matter how large, casts them all into the shade. There is a spirit, a vitality, to a fine ruby which invariably makes itself felt.

But this applies only to stones of the finest color and lustre. Several softer stones are more attractive than the ruby in its "off" moments. Its basic red is so tinged with violet as to approach a deep, glowing pink. Now pink is beautiful when it is beautiful, but too much involved with purple it may easily suggest the most hideous of all colors, magenta. Somebody once said that a woman who would wear magenta would steal. Yet in Burmah, home of the finest rubies, the common people all wear that vile pink, trying to carry out in clothes the color of their famous gem. It is well-known that a given pigment will act quite differently on different materials. The tint of a jewel may be exquisite, when its reproduction in cotton would be execrable. So in Burmah, the native patriotism, laudable enough in itself, gets on the stranger's nerves. Queer how Nature

takes a hand here, too, in the bougainvillea, or Burmah blossom, as the natives call it in India, a study in magenta, one of Nature's few mistakes.

In Siam the ruby is also found, but darker, more like the pyrope garnet, and less lustrous. Those picked up in Ceylon are very pale. In any country, stones both large and clear are extremely rare, though specimens suitable for watch jewels are common enough. It is hoped that as the sapphire deposits of Montana become more thoroughly opened up, important ruby crystals will also disclose themselves, but so far the name "Montana rubies" usually covers certain garnets found there. The "Cape rubies" of South Africa turned out to be only a fine variety of garnet, as did the "Adelaide rubies" of Australia. The syndicate formed to work this supposedly rich find went to pieces when exact science placed the specimens where they belonged.

The pigeon's blood ruby is very near the color of a deep rose-pink carnation; possibly they are as much alike as flower and mineral can be. But the almost living light in the ruby, when cut brilliant, makes suggestion idle. The comparison to the very centre of the red ray in the solar spectrum seems more true.

The rubies found in Montana with sapphire, pale red, like these of Ceylon, are very small. But at Cowie Creek, in Macon County, five miles from Franklin, North Carolina, in certain garnet-bearing rocks, a few have been extracted of as fine a color as the pigeon's blood of Burmah. Some enclose crystals of the newly discovered variety of garnet called rhodolite, but this seems not to impair their transparency or value. Perhaps it improves their color, as the rose tint of the rhodolite is beautiful. Though similar to Burmese stones in appearance, their mode of occurrence is quite different. The white crystalline limestone of Burmah is absent, also the fine red spinels as associates.

The mixed coloring of ruby often becomes uniform by heat. Heating, if gradual, does not injure the stone. The coloring matter, therefore, is not organic. It is due to chromium. A clear, transparent, flawless ruby of any size is the rarest of all stones. During the Renaissance, in the sixteenth century, a karat ruby commanded $2,000; emerald, $1,000; diamond only $250 and sapphire $25. This was the valuation of Benvenuto Cellini.

In the middle of the nineteenth century, ruby, emerald and sapphire could be bought for the same sum, and that very small—about $15 per karat. Now, the price is up again, but far below the palmy days of the Renaissance, when gems were rare. Yet a "twin" diamond and ruby ring at Tiffany's, each stone weighing perhaps three karats, cost in 1909 $22,000, and of this $21,000 represented the ruby!

The localities of ruby, as seen, are not many. Strange that Ceylon, so rich in sapphire is so poor in ruby. India also, though corundum is abundant, discloses very few of gem variety. Ruby Bar in Montana is the hope of Americans, but so far it is pretty much all hope. The earth seems to give up the ruby with difficulty.

Consequently it is of great interest to watch the progress in artificial rubies. As now given to the world, the manufactured, or "reconstructed" are worthy of respect; for they *are* rubies, by ingenuity of man if not by act of God.

Ruby in cold countries is practically absent. It is the child of warm lands—Siam, India, Burmah. The fire of the tropics burns in its heart—like a sacred flame that knows no end.

It is the birthstone of most mediaeval nations for December, the Poles and Russians alone using the turquoise. The latter, however, was the more approved from the eighteenth century to the twentieth. The past few years has witnessed a reversion to the ruby. Its significance to-day is charity, dignity and divine power.

Marbodus says:

> With any kind borne on thy neck or hand,
> Secure from peril visit every land.
> On all thy wand'rings honours shall attend
> And noxious airs shall ne'er thy health offend;
> Whatever prince thy just petition hears,
> Fear no repulse, he'll listen to thy prayers.

The ruby was supposed to be endowed with the power of shining in the dark, lighting up a room as a lamp, whence its ancient name of lychnis, also applied to the spinel. According to the Talmud, the only light Noah had in the Ark was that of the carbuncle, carbunculus in the past covering the ruby as well as garnet and spinel. Its virtues were very similar to those of the garnet, with which in the Middle Ages at least, and to a certain extent long before, it was confounded.

SAPPHIRE.

Hyacinthus was the ancient Greek name for our sapphire. You all know the story of Hyacinth—that beautiful Laconian youth of whom Apollo was so fond; whom he joined in all his pleasures and games. You have read how Hyacinth was killed by the rebound of the quoit which Apollo threw all too far and well; and how, after vainly trying to save his young companion, he exclaimed over the dead body: "Thou diest, Hyacinth, robbed of thy youth by me. Thine is the suffering, mine the crime. Would that I could die for thee! But since that may not be, thou shalt live with me in memory and in song. My lyre shall celebrate thee, my song shall tell thy fate, and thou shalt become a flower inscribed with my regrets."

And even as Apollo spoke, the blood flowing on the ground ceased to be blood. A flower sprang up, the legend reads, more beautiful than the Tyrian; resembling the lily, except that one is purple, the other like silver. Or, in the exact words of Ovid:

> Flos oritur formamque capit quam lilia, si non
> Purpurens color hic, orgenteus esset in illis.

Upon the petals of this flower, as we are told further, Apollo stamped indelibly the Greek AI, AI (Ah! Ah!) to render eternal the memory of his sorrow, which remains to this day.

About nothing in mineralogy has controversy raged more fiercely than this flower. For centuries the discussion continued, opinion differing as to whether it was this or that, but finally settled on the fleur-de-lys, which follows the description better than any other, in color, in shape, and even to the AI on its petals.

Solinus, a connoisseur in gems, flourishing two centuries after Pliny, that is around 250 A. D., describes the hyacinth exactly as our sapphire is now.

Sapphire in all its colors, as well as ruby, is corundum, the hardest of all substances next to diamond. Adamas, the Greek word for indomitable (whence adamantine and diamond), was applied by the ancients to corundum before the diamond became known. Hyacinthus covered the red ruby, the blue sapphire, and variations of the latter, more particularly yellow. The blue sapphire was known as sapphirus hyacinthus, from lapis-lazuli, the blue mineral of our time, then synonymous with azure, and called sapphirus.

The ancients seemed to understand only three varieties of corundum, the red, blue and yellow, but besides these there are green, violet, salmon pink and white. Now, as formerly, the gem color is a deep, velvety, uniform cornflower blue. When "Oriental" is placed as a prefix to topaz, chrysolite, emerald, amethyst, the corundum in some one of its fancy shades is always meant. Unnecessary to say

that these are harder, more brilliant and often more beautiful than the gems they counterfeit.

Besides all these varieties of color, there are the asteriated stones, always cut en cabochon and showing the six distinct rays of a star. This star is due partly to the method of cutting, designed to bring it out, but also to the peculiar arrangement of the original material, supposed to be cleft by innumerable tiny cavities in symmetrical lines. The corundum exhibiting this peculiarity is apt to be less clear than the gem sapphire. It is frequently almost opaque and subject to various defects. In color it varies from deep indigo to very pale gray blue, sometimes with a hint of ruby in its depths. The ruby is also found in asteria form, but less frequently than the sapphire. The pale stone is apt to be more clear, and therefore more lovely, than the dark blue, but is not so much prized by jewelers.

A cutter of genius recently tried bringing out the star, not in the crown of a cabochon stone, but in the depths, at the culet, of a clear transparent specimen, steel blue or gray in color, cut brilliant. The stone was one karat, and from a dealer in Maiden Lane he received for it $100.

No exceptional value as a rule is attached to star stones, though they are subtle and alluring if clear and of a soft lustre. They usually cost about the same as a fine gem stone, which in its turn is less than a ruby of the same size and quality. A flawless karat sapphire seldom fetches even half the same grade of ruby. Fifty dollars often will buy a good karat sapphire of the conventional blue.

Besides the asteria, there is also the opalescent ruby or sapphire, called Oriental girasol; or, according to the color, ruby, sapphire, topaz cat's-eye. This opalescence, contrary to the veiled asteria, has a sheen which is almost a glitter, and a spot or line follows the eye instead of a star. It is always cut en cabochon.

The flaws in sapphire are the same as in ruby; clouds, white streaks, different colored layers. Much depends, for bringing out the best tint, on the cutter. By clever arrangement of the facets, he will often be able to color the whole mass of an almost colorless stone from one spot of clear blue. Such a stone is shown to advantage by being set deep in gold. All blue sapphires, even the best, turn very dark, almost black, by evening light. It is pre-eminently a daytime stone.

Saffron yellow tinged with red is the most valuable of the "fancy" sapphires, or else a pure citron yellow with a golden light. Pale tints of the primary colors are lovely, but fairly common. The violet is rare, and is a more attractive stone, more delicate in tint, and more brilliant than the amethyst. White sapphire, in hardness 8.5, half a degree less than colored sapphire, lacks the peculiar beauty of diamond, the prismatic play.

Ceylon is the home of the "gem" color, as of so many other beautiful stones, but a fine quality of light and peacock blue comes from Siam. This occurrence was known at the beginning of the nineteenth century, but not worked until 1875. In Burmah five hundred rubies are found to one sapphire, but while fine rubies exceed-

ing five karats in weight are exceedingly rare, large sapphires are quite frequent. The color of the Burmah sapphire is so dark as to be almost black, not to be compared to the best of Ceylon.

America is not without its representation. In Montana deposits were discovered during 1865, but not systematically worked, for gold more than precious stones, until 1891. The Montana gems are small, but especially lustrous. They are a bright blue, with a peculiar metallic sheen. Many prefer the softer tint and lustre of the Oriental stones.

Sapphire is "reconstructed" the same way as ruby, and even more successfully, for the sapphire lacks the vital beauty of its queenly sister. Sapphire is one of the most easily imitated of all stones. The gem color looks much the same whether natural, reconstructed, doublet or glass. Indeed the artificial are often the more beautiful.

It is the birthstone for September, an alternative to the diamond for April, and the guardian angel talismanic gem for July. It stands for constancy, truth and virtue, and cures diseases of the mind. In mediaeval times its magic was considered the same as the ruby, yet its less insurgent color made a difference, for it was used to cool the blood, and was much worn by the priesthood, as it is still in Brazil. Having power over the mind, it guarded its wearer against insanity, as the ruby did against suicide. It was said to be the one gem in the Declaration, placed over the High Priest's Breastplate, in the old days of the Jews. A sapphire is also set in the cross surmounting the English crown.

EMERALD.

Emerald, the flower of the Beryl family, has this good thing about it—its habitat is extremely limited. You need not rack your brain for the thousand and one places from which it comes. On the contrary, in its "gem" color, a rich, deep green, the output is almost entirely confined to one spot on the globe—the northwestern section of South America, in Columbia, near Bogota. The mines there, for the most part old and not scientifically worked, are almost inaccessible. Whether the resources are in truth rich, and the investment of American energy and capital in time may bring them forth, or whether the stone is as scarce as the market seems to indicate, one thing is certain: a fine emerald of perfect color, the deep, velvety, moss green, commands a price higher than the finest diamonds. Three hundred dollars a karat is asked for such emeralds and readily obtained. Even at that price they are few and far between. Taken home by the Spanish conquerors, these emeralds are known to the present generation as "old Spanish emeralds," whose price continues to soar and soar. Others, of a light green, sometimes with a slightly yellowish tone, are more plentiful and much cheaper. Colombia produces these too, and New South Wales is sending some, together with Takawaja in Asiatic Russia; but the gem color has been scarce from Nero's day to ours, and happy is she who has inherited a fine one from her ancestors.

You have all read how Nero, who was near-sighted, followed the gladiatorial games in the Coliseum with an emerald. Either the reflection on its polished surface brought the spectacle close to his eye, or else it was a pale stone, hollowed out on both sides, and thin enough to see through, a forerunner of the modern lorgnette. Precious and wonderful seemed such a possession then, attributed to the virtue of the gem itself instead of the cutting, though inexpensive eye-glasses bring about a similar boon in a better manner now. It was thought in those days that to the emerald alone was given this power; but now we know better; every transparent crystal cut with a convex, concave or even flat surface is capable of like magic power. Over this question, whether the relief to Nero's eyes was obtained by reflection or the principle at the base of modern mechanical correction of myopia, antiquarians have wrangled for a hundred years. The fashionable jewels in Nero's time were for the most part cut "en cabochon," convex, like the carbuncle to-day, to deepen and enhance the color and also to conceal defects. But the emerald, its color always true, gained nothing by this treatment except when badly flawed. So it began to be cut flat, possibly for some reason con-

cave, and thus Nero may have discovered its value to his defective eyes.

Moreover, green is a pleasant, restful color to look into, as we all know, who have trees in our grounds, or green furnishings in our homes. Nature knew what she was about when she made the earth brown and vegetation green. If it were not so, if these two vast surfaces were a strong scarlet or a hard blue, we might all go mad! Even the sea has a powerful admixture of green, and the sky is not without its ameliorating influence. It is reserved for man, and man alone, to call forth garish tints to clash with Nature's endless harmony. When she affects a strenuous hue, and this mostly in the tropics, where it has a certain place, she uses it sparingly.

Emeralds were first brought to Europe in any quantity from South America, at the end of the sixteenth century, and from then till 1830 all emeralds in the market were from the mines of Colombia. The spot pointed out to the Spaniards, on March 3rd, 1537, by the Indians who had presented them with a gift of emeralds, is in the neighborhood of Bogota. The deposit at this place, Somondoco, whose wild, inaccessible heights caused the Spaniards to abandon their works there, was in 1901 started up again by an English company, but as yet only second quality stones have been found.

About one hundred miles from Somondoco, another locality richer and of greater importance was discovered, and is now the only one in Colombia where fine emeralds are met with. One mine there is named "Esmeralda"; but the Indians are hostile, the climate unhealthful, and the output limited. It is somewhat west of the celebrated Muzo claims, more or less abandoned, about 94 miles northeast of Bogota. In the face of all this, it is quite comprehensible why the emerald is the most expensive of stones, when of the desired tint and without marked defects. So seldom is it perfect, that "as rare as an emerald without a flaw" has passed into a saying. While easily imitated in glass and doublets, the emerald so far has defied "reconstruction," another factor in its ever-increasing scarcity and cost. The cost is all the more amazing when one realizes that its color for these days, when soft olive prevails, is too intense; that its lustre is by no means brilliant; and that it is the least durable of the orthodox precious stones. When taken from the mines the mineral is said to be quite soft, like certain marbles, because of a large admixture of water, but hardens with exposure to the air. In gem form the hardness is something less than true topaz and not much greater than garnet—7.5 to 8. Its specific gravity is 2.65 to 2.75, hardly more than quartz, and its lustre vitreous to resinous. Its composition is silica 68; alumina 15 to 20; glucina 11 to 14. The coloring matter is due to chromium, which with various affinities produces widely varying hues.

In form, when placed on the market, it is usually step-cut, the rich green being most effective thereby; but when sufficiently clear, it is cut brilliant, and when clouded or defective shows best en cabochon.

Pliny says it was universally agreed not to engrave so valuable a stone. Engraved emeralds are the rarest of the rare.

The ancients believed that the emerald had power to cure diseases of the eye. Another notion was that it would reveal the inconstancy of lovers by changing color. It was the symbol of immortality, and helped its wearer to resist temptation and sin. As late as the seventeenth century, powdered emerald was used as a drug. It was regarded as a powerful remedy for epilepsy, dysentery, fever and the bites of serpents. Its green refulgence was supposed to dazzle the reptiles, as Moore has noticed in his lines:

> Blinded like serpents when they gaze
> Upon the emerald's virgin blaze.

Emerald is the birthstone for May and the guardian angel talismanic gem for June, but centuries ago the nations were divided on this subject, half preferring the agate, now the birthstone for June. In fact these months and gems were exactly reversed. Modern approval seems to uphold the Arabian, Poles and Russians, instead of the Jews, Romans, Isidorus, and Italians.

> Of mighty use to seers who seek to pry
> Into the future hid from mortal eye.
> Wear it with reverence due, 'twill wealth bestow.
> And words persuasive from thy lips shall flow,
> As though the gift of eloquence inspired
> The stone itself or living spirit fired.
> Hung round the neck it cures the ague's chill,
> Or falling sickness, dire mysterious ill;
> Its hues so soft refresh the wearied eye,
> And furious tempest banish from the sky:
> So with chaste power it tames the furious mood,
> And cools the wanton thoughts that fire the blood.
>
> *Marbodus.*

CHRYSOBERYL.

Chrysoberyl, though hard, 8.5, and rather heavy, 3.5 to 3.8, with lustre vitreous to resinous, is valued not so much in its normal state, which may be yellowish green or brown, transparent or opaque, but for its two famous varieties, the cat's-eye and alexandrite.

In Ceylon, the cat's-eye is the last thing an Oriental will part with, for it is a luck-stone, a charm against evil. It is also the emblem of endless prosperity. In Europe, its price is governed largely by fashion. A fine karat stone may be worth ten dollars or a hundred. When the Duke of Connaught gave one to his bride, Princess Margaret of Prussia, it at once, in England, became the vogue.

In America, the cat's-eye is scarcely known. A few specimens are at Tiffany's for those willing to pay the price, yet while of good color, they have not always the perfect streak, which is white, infrequently golden, and well-defined, running evenly from end to end across the middle of the stone, opaque and cut en cabochon. The ray should be single with the edges showing brighter, particularly by artificial light or in the sun, and exhibiting a brilliance almost phosphorescent. Specimens in which the line spreads vaguely, or is repeated one, two or three times, are not the best. Color is of no consequence compared to the perfection of the ray. Olive green seems most favored, but brown has its admirers. The ray, like the asteria of the sapphire and ruby, is supposed to be composed of multitudes of minute parallel tubes which, when structurally perfect, by skillful cutting can be made to reflect light still more effectively. Yet scientists do not explain this sufficiently clearly to impress it on the lay mind.

Cymophane is the ancient name derived from a word signifying "floating cloud," given to the opalescent variety, rather than to the distinct cat's-eye specimen, which simply is the cymophane carried by clever manipulators a step farther, it being possible to transform the cymophane into the cat's-eye, but not vice-versa.

The chrysoberyl cat's-eye has an understudy, so to speak, in quartz, a far lighter and softer stone, and not found in any shade of green, only in greenish or yellowish gray and brown. It is semi-transparent, the quartz cat's-eye, while the chrysoberyl generally is opaque. When cut en cabochon it shows a band of light, but silky rather than phosphorescent, resulting from the fibrous grain of the stone itself, or an intimate admixture of asbestos. The quartz cannot be compared to the chrysoberyl, and when side by side could never be taken for it, even by a novice. Yet sometimes the false is sold for the true, by irresponsible parties in Ceylon, where both abound.

Cat's-eye was undoubtedly known to the ancients. It was described by Solinus as "a gem picked up in the bed of the Euphrates, in appearance like the Proconesian marble, except that in the middle convexity of the stones a green thing shines through like the pupil of an eye." This more precisely applies to the quartz cat's-eye.

In Brazil, the normal chrysoberyl is found transparent, translucent or semi-opaque, and without the cat's-eye. It is called "Brazilian chrysolite" and is very like the true yellowish green chrysolite or peridot, but lacks its brilliance. Perfectly transparent stones even in Brazil, where they are valued for their color rather than the chatoyant ray, are very rare. When found, they are generally cut en cabochon, with convex gold at their back to increase the lustre.

The newly discovered "spodumene" of North Carolina has yellowish green crystals so like the "Brazilian chrysolite" that in gem form they might easily be mistaken for each other, though spodumene is inferior to chrysoberyl in hardness and of entirely different constitution.

The singular alexandrite is a third variety of chrysoberyl. It was so called because discovered in the Ural Mountains within the Czar's dominions on the day in 1830 when Alexander II. of Russia attained his majority. Since then, larger and more beautiful specimens have turned up in the world's great jewel-box, Ceylon. The finest of these are transparent, very dark, olive green by day and rich raspberry red by artificial light. Some might be described as a clean pistache or tourmaline green by day and purplish pink or amethystine by night. Usually one of the colors, either green or red, is pale and indefinite, if the stone is shallow, or else too dark, if thick. Alexandrite is not effective unless rather large and deep, skillfully cut and of the best color. A stone that is the correct hue both by night and by day is extremely rare. Yet the writer possesses one such, a Ceylon stone. Its green by day is always olive or sage, the sure sign of Cingalese parentage, while its gala color is a magnificent red, sweeping the whole surface in brilliant flashes. This is perhaps the gem alexandrite of Ceylon, not so effective by day, in its dull sage green, sometimes mixed with brown, but a wonder of burgundy red by night, while the Russian gem at its best is a very pale emerald by day and a columbine pink at night.

Not only are the Russian crystals smaller than the Cingalese, but the green is frequently uncertain, bluish, without depth or allurement, nor is the red satisfactory. All the same the Russian is favored both by mineralogists and jewelers; and when of a light clear emerald green by day and a purplish pink or amethystine ruby by night, it is a striking gem. The Russian, however, is exceedingly defective, flaws interfering with its brilliance, while the Cingalese is apt to be structurally far more perfect.

Strongly dichroic, even trichroic, the secret of the strange changes from green to red, the alexandrite appeals to Russia not only through its first appearance there, but because it exhibits the national military colors. Still it is odd, as a rule, rather than beautiful, high-priced largely because it is scarce, and growing scarcer

every year. Moreover, it is the only stone which offers an entirely different color by day and by night.

Its price varies from $40 to $100 per karat, according to its perfection, and one might say, according to the need and knowledge of the one who wants to buy or sell.

Alexandrite is owned almost exclusively by collectors. The public, in this part of the world at least, knows it little and values it less. Considering the lack of pleasure it gives the eye, its price seems out of all proportion to its charm. When opaque, it suggests the bloodstone, and even then is not inexpensive. Often it cannot be bought at all, unless a collector parts with one.

Those who live with the alexandrite say it grows on you; its very strangeness becomes in the end a potent attraction—but though valued greatly in Russia and Ceylon, it is not in this country a favorite with the jewelers, who pronounce it "a slow seller."

SPINEL.

Spinel resembles ruby in color, but in most other respects is wholly different. It is softer, 7.5 to 8, and lighter, 3.5 to 3.7, also not dichroic, showing the same color in all directions, and single refracting. Its lustre, like ruby, is vitreous, and it takes a brilliant polish, but not equal to ruby.

It is said that all red spinels have a tinge of yellow reflected from the interior of the stone which absolutely distinguishes them from true ruby. The deeper the color, if clear, blood-red, poppy-red, carmine, the more highly prized. This is the gem color.

Spinels of a light shade of rose inclining to violet are referred to as balas rubies. Rose-colored topaz closely resembles this variety, but topaz is double refracting and strongly dichroic. Spinels tending towards purple in tint suggest, even if paler, the almandine of the garnet tribe. There is also a spinel which comes near the amethyst in color, and is often sold as such, though rarer and more valuable.

The spinel of a pronounced shade of yellow is called rubicelle. It may be orange-red, and often accompanies topaz in Minas Novas, Brazil, where it is known as vinegar-spinel, on account of its yellowish red. The name vermeille, applied by the French to certain garnets, is likened to rubicelle. This color, in garnets at least, is considerably more valued than it used to be, since the hyacinth has again come to the fore.

Fine spinels are more abundant than fine rubies, because more free from defects. Small ones are plenty, but those of large size, weighing from eight to ten karats, are rare. The large "Black Prince Ruby" in the English crown is not a ruby, but a spinel. It was presented to the Prince by Don Pedro, King of Castile, and worn in his helmet by Henry V. of England at the battle of Agincourt. It is cut en cabochon and has a hole showing its Indian origin drilled through it which has been plugged up by a smaller stone. For long it was thought to be a ruby.

Spinels were found by Marco Polo, as early as the thirteenth century, in Badakshan. They are also found in Ceylon, Burmah, Australia, and with rubies and sapphires in Siam. In the United States they are practically non-existent, except green spinels, some transparent and used as gems. Such have been taken from North Carolina. It is considered remarkable that they are not found with sapphires in Montana.

Twinned spinels, two faces with one back, are so common that other minerals, including diamonds, are said sometimes to be twinned "according to spinel law." Often one of a twin adjoins a third, and

that again a fourth, with the common base, making very complicated groups.

Black spinel is called pleonaste. It is greenish black in mass, dark green in thin layers. Like all spinels, it takes a good polish, and may be used in mourning jewelry. It occurs near Kandy in Ceylon, because of which it has been known as Ceylonite. Small, brilliant crystals were found imbedded in some of the blocks ejected by Mt. Somma, the ancient crater of Vesuvius. Large specimens have been discovered at Amity, N. Y., but few are suitable for cutting. Blue spinel is also known, but like black, it is of little importance.

The balas ruby, or light rose spinel, according to ancient lore, represses lascivious thoughts, heals quarrels between friends, and gives health to the body.

Spinel was known to the ancients, but became confused with ruby. The term "lychnis," a lamp, a flame shining in the dark, meant either. Lychnis was supposed to protect the crops from hail and tempests.

There is no mention of spinel in the mediaeval or modern lists of natal stones. Not till comparatively recent times was it distinguished by competent mineralogists from ruby.

A story regarding spinels in Ceylon is very similar to that of chrysolite on the Island of Topazius. The Arabs had a tradition that sea-cows gathered spinels from the Kohaf Mountains and left them on the ground at their base. Stone-gatherers would throw lumps of clay over them, the cows, disappointed at not finding their plunder, returned to the sea, when humans came and gathered them in.

BERYL.

BERYL-SONG.

We whose home is the Beryl,
Fire-spirits of dread desire,
Who entered in
By a secret sin,
'Gainst whom all powers that strive with ours are sterile,—
Fire-spirits of dread desire,
We whose home is the Beryl.

Dante Gabriel Rossetti.

Sometimes it happens that a humble family is found closely related to a great lady. The world does not know this until suddenly it comes out. Then everybody is more or less surprised and embarrassed.

The emerald is such a great lady. She is simply the vivid green variety of the beryl group, whose other phases are the aquamarine and its yellow kin. These poor relations of the aristocratic sister, who sits secure in her inaccessible retreat, are of comparatively little importance, though precisely like her in all except personal appearance. They are of her blood, but cannot eat at her table. She is rich and rare, they are common.

Aquamarine, the most expensive variety of beryl next to emerald, is a trifle harder than the latter, and its crystals are clear and often of large size, but it is found in abundance. Its name means sea-water; the "gem" color is deep water-blue; but generally it is various shades of light blue or green, and colorless. The last, if slightly tinged with blue, strongly resembles the blue diamond. It has, besides the tint, almost the same lustre, but without prismatic play. All beryls are very brilliant by artificial light, and therefore desirable evening stones.

Those only, either blue or green, which suggest sea-water are called aquamarines; but all are identical in composition. Beryl proper usually is yellow. The deep blue are from North Carolina, California, Brazil and Siberia; the yellow, yellow brown and golden from Connecticut, the Ural Mountains and Siberia. It is doubtful if the best blue is ever entirely free from a tinge of green.

The beryl was known in earliest times and was somewhat engraved upon. It is of a singularly compact structure, for intagli found thereon often retain their original surface polish to this day. Not so the emerald, which never was engraved upon in the time of the "perfect" Greek school, but at a later period. Engravings on both, beryl as well as emerald, are rare.

Pliny notes the variations in color with almost the exactness of to-day. The most admired, he says, emulated the green tint of pure sea-water. Then came the sapphire-like sort, and after that a yet

fainter tinge of blue which was the one used for engraving. Last came a greasy yellowish green, but little valued. The yellow beryl of to-day seems not to have been known.

Beryl was then highly prized for rings and ear-drops, and was the only one among the precious stones facetted by the Roman jewelers, who cut it into a sexagonal pyramid. In India it was worn in the form of long, cylindrical beads, though the most perfect in color were not bored, each end being secured by a gold boss. Then, as now, the backs were often painted, to deepen the tint, and set solid. The Hindoos were admirers of both emerald and beryl and set them much the same way.

The intagli were sea-subjects in which gods, waves, fishes, dolphins, and the like appeared. Probably the grandest intaglio extant of the Roman period is the bust of Julia Titi, on an aquamarine 2½ by 2¼ inches, signed by Evodus. For nearly 1,000 years it formed the knosp of a golden reliquary presented by Charlemagne to the Abbey of St. Denis, in which it was set with convex back uppermost, being regarded as an invaluable stone.

The beryl was a favorite for engraving with artists of the Renaissance. These comparatively modern works are on the green sort, the sky-blue being much more rare. The term aquamarine seems not to have been bestowed. Pliny handicapped them with long names meaning sapphire-blue and air-blue, though he classed them as a variety of beryl. Bluish ones have been called aquamarine, green and yellow beryl, within the last forty years.

"It is the vast supply poured in from Saxony, Siberia and America," writes King, in 1865, "that has sunk the value of this beautiful stone so low in modern times."

Morganite, the rose red variety of beryl, discovered in California in 1911, and found later in Madagascar, was named in honor of the late John Pierpont Morgan, who, through the gift of his rare collection of minerals and precious stones, a part of the Paris Exposition of 1900, to the American Museum of Natural History, did so much to educate the world concerning them.

The yellow is the least valued, yet it is sometimes, with its high lustre, a dream of beauty. In the American Museum of Natural History is a truly splendid golden beryl from Connecticut. One exactly like it was found at Tiffany's at a trifling price for so enchanting a gem.

Beryl, while not free from defects, is very clear. The first idea that led to modern eye-glasses was caught by looking through a double convex beryl as long ago as the fifteenth century. Beryllus is the Latin term for a magnifying glass—whence the German "brille," a pair of spectacles. The ancients attributed to the gem itself the quality that might have come through its shape, for the beryl was long supposed to endow its possessor with second sight.

You remember how in Rosetti's beautiful poem "Rose Mary," the beryl plays so important a part—is, indeed, the chief protagonist—in the grave situation of the unfortunate young woman. Says the troubled mother:

"Tall Rose Mary, come to my side,
And read the stars if you'd be a bride.
In hours whose need was not your own,
While you were a young maid yet ungrown,
You've read the stars in the Beryl-stone."

. . . . . .

The lady unbound her jeweled zone
And drew from her robe the Beryl-stone.

. . . . . .

Paler yet were the pale cheeks grown
As the gray eyes sought the Beryl-stone.

. . . . . .

And lo! for that Foe whose curse far-flown
Had bound her life with a burning zone,
Rose Mary knew the Beryl-stone.

. . . . . .

Three steps back from her Foe she trod:—
"Love, for thy sake! In Thy Name, O God!"
In the fair white hands small strength was shown;
Yet the blade flashed high and the edge fell prone,
And she cleft the heart of the Beryl-stone.

. . . . . .

And lo! on the ground Rose Mary lay,
With a cold brow like the snows ere May,
With a cold breast like the earth till Spring.

. . . . . .

In a gracious sleep she seemed to lie;
And over her head her hand on high
Held fast the sword she triumphed by.

In the seventeenth century the stone was in great demand for purposes of divination, the method often being to suspend a ring in which was set a beryl over a bowl of water, the edge of the bowl marked with the letters of the alphabet, the stone giving answer to questions by stopping before certain letters, after being whirled about. It was also supposed to possess power over evil spirits, and a man might call a devil out of hell, to answer questions, if he held a beryl in his mouth. The sphere in the English crown is set with a blue beryl, symbolic, possibly, of these magical powers.

As the birthstone for October the beryl was used by all nations from the beginning of the zodiacal science, in the Middle Ages, till the opal became favored by moderns. It is also the guardian angel's talismanic gem for December. Happiness and everlasting youth are supposed to attend its possessor. In olden times, it was called "the sweet-tempered stone."

Marbodus says:

The most admired displays a softened beam,
Like tranquil seas or olive's oily gleam.
This potent gem, found in far India's mines,
With mutual love the wedded couple binds;
The wearer shall to wealth and honors rise
And from all rivals bear the wished-for prize:
Too tightly grasped, as if instinct with ire,
It burns the incautious hand with sudden fire.
Lave this in water, it a wash supplies
For feeble sight and stops convulsive sighs.

OPAL.

No wonder that in the absence of the diamond as we know it now, with all the colors of the rainbow flashing from its pure depths, the opal, in a different way exemplifying the same idea, should once have been the cynosure of all eyes.

"Of all precious stones," says Pliny, "the opal is the most difficult to describe, since it combines in one gem the beauties of many." He also observes that, like the emerald, the opal was almost never engraved, being altogether too costly and rare.

Sixteen centuries later another expressed himself in these words: "The opal is a precious stone which has in it the bright fiery flame of the carbuncle, the fine refulgent purple of the amethyst, and a whole sea of the emerald's green glory; and all of them shining with an incredible mixture and very much pleasure."

Another of still later date, speaking of the red, yellow, green, blue and violet of the opal, mentions how they "appear at times in certain parts of the stone, crossing each other in vivid play with an effect that is almost magical."

There was, indeed, no precious stone which the Romans valued more for itself alone. In those days it was rare and expensive. Probably all in existence came from Hungary. They were often carried to India via Constantinople, whence they were returned, like Brazilian diamonds centuries later, with an Oriental prefix and greatly enhanced price—so valued then as now were the gems of India. The East has produced no opals; and it is the one gem which defies imitation.

Rarity rather than beauty fixes value; rarity and beauty in equal measure—plus popular demand. All these desirable attributes the opal possessed at the beginning of the Christian era; but early in the nineteenth century it began to be more plentiful, through the discovery of the Mexican mines; and after the publication of "Anne of Geierstein," in 1831, by Sir Walter Scott, who invented the superstition of its ill luck, it ceased to be desired.

Senator Nonius, in the reign of Julius Caesar, possessed a ring set with an opal as large as a filbert, valued at $100,000. Mark Anthony coveted the jewel, but its owner turned a deaf ear, whereupon the Senator was told that he must choose between the opal and Rome, which he did in favor of his gem.

The ancients, like the Orientals to this day, considered the opal the source of all possible good, the most beneficent as well as the most beautiful of precious stones. Not only to them did it possess specific powers of its own, but as its colors symbolized all gems, the ruby, sapphire, amethyst, emerald, so its magical properties were sup-

posed to follow suit. It was also a remedy for eye trouble, to which some attribute its name.

Probably all this quite as much as its monetary value influenced Nonius to give up Rome rather than part with so potent a talisman.

Only for eight decades, and exclusively among Europeans and Anglo-Saxons, has the opal stood for misfortune, and that solely because of an imaginative writer's arbitrary whim. A lie or a superstition once rooted in the credulous mind, once in possession of the judgment or the feelings, is difficult of eradication, as proved but too conclusively in 1909 and 1914. Yet with the opal as the Pole and the War, there were some who kept their heads and discerned instinctively the truth.

The Empress Eugenie would never wear the opal, fearful of ill-luck, and spent half her life dethroned and forgotten, while Queen Victoria loved the stone, presented each of her daughters with a parure of opals and diamonds, and died reigning over half the world!

Still, with all this detraction, the opal loses its present sinister significance for those born in October. Previous to the eighteenth century, all nations used the beryl. Opal symbolizes hope, innocence, purity.

Pliny says the opal was sometimes called Paedorus, signifying youthful love. The pseudo Orpheus, writing two centuries before Christ, seems to indicate something similar:

> With its complexion of a lovely boy,
> The opal fills the hearts of gods with joy;
> Whilst by the mild effulgence of its light,
> Its healing power restores the failing sight.

The most interesting opal reaching the market at the present time is the Australian. Of this the first recorded "find," in Queensland, was in 1890. The miners there, as well as in New South Wales, work with difficulty, the long-continued droughts taking the heart out of men and killing horses. Yet in the first fifteen years the value of the annual output increased from $15,000 to more than a million, not counting sales which cannot be followed. The world seems to be depending for its choicer mineral products on this distant land more and more.

Hydrophane, which assumes transparency only when soaked in water, is a singular variety of opal. Like the two famous Southern Governors, it needs at frequent intervals a drink. The stone absorbs almost its bulk in water, emits small bubbles of gas as the liquid gradually penetrates, and keeps its transparency some time, but when dry again becomes opaque. It is found with fire opal, is generally white or dull yellow, but when "full," like its human prototype, often appears quite brilliant. Hydrophane is in strong contrast to Sir Walter Scott's baleful gem, destroyed by a single drop of water—holy water! That fable defies not only history but every law of mineralogy.

Opal, like pearl and turquoise, is greatly improved by contact with the body. Warmth seems to bring out all its radiance, while

cold has a repressive effect. Always the gem is more beautiful on a dark day, in an interior, with the light striking it sparingly. The open day reduces its wonders to a ghastly pallor, particularly if the air is chill and the sky cloudless.

The process of nature which forms opal is similar to that of turquoise. Its hardness is 5.5 to 6.5, specific gravity 2 to 2.2, lustre sub-vitreous.

For centuries the mines of Hungary were the main source of the best quality. Not only was it harder, but the harlequin effect under the slightly veiled, milky surface, was and still is, by jewelers, greatly admired. The output is smaller than in the past, but it is highly esteemed, for it is the most durable, with the smallest admixture of water, of any in existence. But the Australian deposits are gradually taking the place of the Hungarian, not only because they are of almost as good quality, but are considerably more brilliant. The Hungarian is milk-white in body, with the colors, in subdued shades, distributed irregularly in small patches. These pastel tints, so greatly broken, compared to the superb rose, blue, green and purple of the Australian, with its more uniform distribution over larger areas, seem to the careless observer a bit tame, but they are valued by experts as more rare. The body of the Australian has a decided tinge of yellow, a good background for the bright, broad flashes. Altogether it seems a more *emotional* stone.

There is a tremendous output of opal from Mexico, often extremely beautiful in play of color, blue and green predominating, but it is less durable than the Hungarian or Australian and inclined to fade.

An opal of interest is fire-opal, called by the ancient Mexicans sun-opal, in deference to their god. This was first brought to Europe by Alexander von Humboldt. In body color it ranges from yellowish to brownish red.

The Empress Josephine possessed one of the finest fire-opals of modern times. It was called the "Burning of Troy," from the blaze on its surface. The obverse was opaque, a peculiarity of the Honduras stone. Where is this wonder now?

In the American Museum of Natural History is a superb fire-opal of deep luminous red, with an effect similar to crackled glass, or frost work. This might well be the famous "Burning of Troy," except that it is less a sweep of flames than hot, glowing, scintillating anthracite. If this fiery disturbance is due to flaws, as some think, it is a glorious imperfection.

The most recent contribution to the market is the black opal from Lightning Ridge, New South Wales, Australia, where it was accidentally found, while mining the usual variety. Not all have the black or very dark green body. Frequently it is gray, light or dark, not so very different from normal opal, only with a more brilliant contrast between the colors and the background. In the gem stone, soft dim greens, purples and passionate reds move subtly in the shadows, then flash forth with startling fire, yet in the main

create a rich, imaginative, sombre atmosphere unlike any gem on earth.

But we cannot be happy with it long. The supply, widely exploited half a dozen years ago, is diminishing, the pocket at Lightning Ridge has run out, with nothing in sight. Naturally, its price is mounting rapidly. If you have one of these unique gems, think twice before you part with it and hesitate before you pass one by. Even the less pronounced black opals can be identified by almost anybody. In all opaldom there is nothing quite like this mingle of colors against black, green or smoke gray. Light or dark, it is *sui generis*.

Should the notion of its influence for evil pass away, and the supply, now so abundant, begin to diminish, it is quite possible that "noble" opal may regain its former exalted position; for the Hungarian mines are failing, the Australian in a desolate country are worked under difficulties, the Mexican as a rule if abundant and beautiful is of inferior quality, and it is unlikely that its peculiar loveliness ever can be reproduced by human skill.

In "The Birth of the Opal" a poetic idea is caught and happily expressed by Ella Wheeler Wilcox:

The Sunbeam loved the Moonbeam,
  And followed her low and high,
But the Moonbeam fled and hid her head,
  She was so shy—so shy.

The Sunbeam wooed with passion;
  Ah, he was a lover bold!
And his heart was afire with mad desire
  For the Moonbeam pale and cold.

She fled like a dream before him,
  Her hair was a shining sheen,
And oh, that Fate would annihilate
  The space that lay between!

Just as the day lay panting
  In the arms of the twilight dim,
The Sunbeam caught the one he sought
  And drew her close to him.

But out of his warm arms, startled
  And stirred by Love's first shock,
She sprang afraid, like a trembling maid,
  And hid in the niche of a rock.

And the Sunbeam followed and found her,
  And led her to Love's own feast;
And they were wed on that rocky bed,
  And the dying Day was their priest.

And lo! the beautiful Opal—
  That rare and wondrous gem—
Where the moon and sun blend into one,
  Is the child that was born to them.

TOPAZ.

Attention was first called to the topaz in the sixteenth century, following the discovery and settlement of Brazil. Early in the nineteenth, it became very popular and continued so till about 1870. After that it was little valued or worn. No stone has been more subject to fluctuations of fashion, with consequent extreme variation in price. At present, with all colored stones, its price is constantly increasing, perhaps $8 a karat just now, but doubling or trebling if the specimen is large and fine.

The best topaz is from Brazil, usually in shades of golden yellow; less frequently yellowish brown; often mixed yellow and brown, with a hint of red, as in hyacinth; rarest of all rose and ruby. Pink, so uncommon in nature, is easily produced artificially from brownish-yellow stones by slow heat. Of these the darker are sometimes called "Brazilian rubies," while the lighter are almost exactly the shade of Kunzite, pale rose tinged with lilac. A happy accident disclosed to a French jeweler this possibility of the topaz.

The yellowish brown or "Madeira" color, so-called from the wine, is most desired and is sold readily, the yellow being left much longer on the jeweler's hands. This hue, like that of the Spanish "burnt" topaz, accords well with red hair.

There are also in Brazil perfectly colorless specimens, white as the whitest diamonds, which take a high degree of polish, as does all topaz, and are called by the Portuguese pingos d'agoa, drops of water. At first glance, on snowy cotton, they seem as beautiful as diamonds, except for the lack of the prismatic play, but the slightest moisture dulls them. The celebrated "Braganza diamond," 1,680 karats, in the Portuguese Royal treasury, has been pronounced a white topaz. Some of these pellucid gems are found in sizes which would fill a water decanter, could they be melted and poured in, and often they are without a single flaw. In Brazil these pingos d'agoa are sometimes called "slaves' diamonds."

They should not be worn on warm, damp flesh. White topaz is found as worn pebbles along streams and rivers in Minas Geraes, Brazil, where are diamonds also, but the most abundant are yellow, sometimes tinged, often in spots, with brownish red. A few bluish and greenish crystals have been found in Stoneham, Me., and at North Chatham, N. H.

Topaz occurs also in Siberia, a number of whose specimens are liable to change by exposure to sunlight. Pale blue turns to pale yellow, deep yellow to dirty white. The finest topaz crystals in the British Museum come from Siberia, and have to be protected from

light. The color in such cases is due to organic pigment. As far back as 1737 topaz of a greenish tint was mined in Saxony, the only important locality in Europe producing this stone, and put on the market. It was then called Schnecken topaz, from Schneckenstein, where it was found. Decorations in the Green Vaults at Dresden bear witness to the beauty of some of its stones.

So far the true topaz has been under discussion, 8 in hardness, 3.6 in specific gravity and lustre vitreous, but by far the greater quantity in the market is simply metamorphosed citrine, or pale yellow quartz, 7 in hardness, 2.65 in specific gravity. Of this, the cairngorm, or smoky quartz, is abundant in Scotland, the pale yellow in Saxony, the sherry-colored in Spain. Citrine also occurs abundantly in Brazil. There is little in North America. Smoky quartz, together with light blue, light green, white and salmon-colored is found in Colorado; but none in great quantities. A remarkable deposit disclosed itself in 1868 in Switzerland, Canton Uri, near the Tiefen glacier. The largest of its large specimens is now in the British Museum. Citrine quartz, in its natural yellow shades or changed to orange brown by heat, is always passed off as topaz, perhaps with qualifying prefix of Indian, Occidental, Bohemian, Spanish. There is the true Indian topaz, of a saffron yellow color, in Ceylon as in Brazil, but very rare. Spanish topaz is citrine of a deep brownish yellow, while "golden" is sometimes applied to citrine as well as the true Brazilian, though the latest designation for such in this country is "sun." It is confusing to the amateur, and a reliable house should always be consulted if the true gem is desired; it is rarely kept elsewhere than at places of the rank of Tiffany. Considering that the true is worth ten times the false, which falls to the level of amethyst, rose quartz, rock crystal, it is well to become informed.

The average jeweler recognizes as topaz only the yellow stones in their various shades from pale to reddish brown, but the blue, or blue tinged with green, are very interesting. Usually it is a pale shade, but a darker tint is found, called "Brazilian sapphire," also applied to blue tourmaline. The pale, bluish green or greenish blue is very similar to aquamarine, and one is often sold for the other, but topaz is heavier. In pure methylene iodide topaz sinks, while aquamarine floats. As yellow tinged with red or brown forms the standard color, the stones most likely to be mistaken for topaz, besides the citrine just mentioned, are yellow sapphire, called Oriental topaz, yellow zircon, and hyacinth garnet, or essonite—the cinnamon-stone. Because of the long familiarity with this shade of topaz, reddish brown, almost always quartz, and produced by heat, it may be said to be the popular color. Few know any other, except pale or golden yellow, which may be the true topaz, but more often is citrine. The sale of blue or pink is so infrequent as to be negligible.

The faults of the topaz, lowering the value of the stone, are impure color, fissures, turbidity, and cavities, either empty or filled with liquid. In burning, topaz must be heated gradually, else it will be fissured. There are several methods, but the best is to pack it in

a crucible, with powdered charcoal, ashes or sand, then slowly heat and slowly cool.

Topaz is not artificially produced as yet, but good imitations are made, as in the case of most colored stones, called doublets. They are composed of strass, a high order of glass, as a basis, and are always of inferior hardness.

While there is no true "gem color" with the topaz, the reddish brown being as pleasing as the golden, this stone may be helped or hindered by its cut. Unless very large, it should always receive the brilliant form, which immensely increases its lustre and beauty. The topaz used to be step cut, but in the United States almost all good specimens are now cut brilliant, which enhances the charm of most transparent stones, except possibly the emerald.

Forty years ago, in the zenith of its popularity, the cost of topaz was about the same as at present, but between then and now it declined to less than half.

Topaz is, and has been through all ages, and with all nations, since its discovery four centuries ago, the birthstone for November. It is also the talismanic gem of April's guardian angel. Though not known till the sixteenth century, it was met by the general belief, on the verge of decline, in the esoteric power of gems, and was immediately dedicated to the cause of friendship, fidelity and fruitfulness. It proved a favorite stone with the married and, held in the hand of a woman in childbirth, was said to lessen suffering.

TOURMALINE.

Little Dutch children, toward the end of the seventeenth century, playing with a pretty crystal under the torrid sun of Ceylon, which was than a dependency of Holland, noticed that it attracted light bodies, straw, paper, ashes, at one end while repelling them at the other. It was soon exhibited in Europe as a curiosity, and was considered a sort of magnet. For fifty years further it appears to have been little known, as Linnaeus, the first to attribute its attractive powers when heated to electricity, had never seen one. In 1740 a specimen was worth ten Dutch florins, and it was finally christened tourmaline, a corruption of its Cingalese appellation.

Tourmaline is now found not only in Ceylon, but Burmah, the Ural Mountains, Brazil, besides Maine, Massachusetts and California. Its colors are often beautiful, and the gems of good size. Red tourmaline, called rubellite, and strikingly like the ruby, is the most valuable. In the American Museum of Natural History, there is a superb example of rubellite, cut brilliant and weighing 11 7/32 karats, from Madagascar. Red are found in Burmah, Maine and California. The Californian, in San Diego County, while abundant, is said not to be as good quality as the Maine. Mount Mica at Paris, Maine, and Mount Apatite at Auburn, give forth abundantly the finest tourmalines in the world, of all colors save brown. Dark and yellowish-brown abound not only in Ceylon, but two or three hundred miles southeast of the Vale of Cashmere, in the Himalayas, where green is also abundant, but the crystals are small. Beautiful green in all shades, light, dark, olive, grass, comes from Maine, California, and particularly Brazil, where there is little of the red but abundance of green, the most widely distributed on earth and the cheapest. Usually the green is yellowish or bluish, generally very deep in color, sometimes almost black, yet there is one shade almost exactly like the green garnet, and when perfect, except for the adamantine colors, it is practically as brilliant. Emerald green is rare, but when found is as beautiful as real emerald, and called "Brazilian emerald." This is emblematic of the priesthood in Brazil, and is much worn by priests in rings.

In Ceylon tourmaline of yellowish green occurs in abundance. It is similar to peridot, and is known as Cingalese chrysolite. The green in Ceylon is less deeply tinted than the Brazilian.

Blue tourmaline (indicolite) is rare. It may be light or dark, pure indigo or tinged with green, as are specimens in the American Museum of Natural History. In Brazil the blue are known as "Brazilian sapphires." A few good crystals have been found at Paris, Me., and at Goshen, near Chesterfield, Massachusetts. The discovery

at Mt. Mica, bringing in during the latter part of the nineteenth century something like $50,000, was most important. The Mt. Apatite deposits revealed themselves in 1882. In the twenty years following fifteen thousand crystals were taken out. Cut gems from these ranged in weight from six to eight karats. The red crystals at Paris and Goshen, were found surrounded by dark green tourmaline. People will remember the story by H. H. (Helen Hunt Jackson), who lived in Chesterfield during the discovery of crystals there, and wove about one of them the charming fancy found in "My Tourmaline."

Tourmaline is a very complex substance. It contains fourteen elements, though none have all. Silica and alumina in about equal proportions form three-fourths of the whole. All tourmaline is strongly dichroic, except rubellite. Consequently, to obtain the best results, a crystal must be cut most carefully in a certain direction. Tourmaline more than any other stone needs a skillful lapidary. No precious stone, except perhaps topaz, resembles tourmaline in its electric features, so that alone would easily distinguish rubellite from spinel, garnet or ruby. This variety runs from pale rose to rich ruby red. The color of tourmaline is not due to mechanical intermixture of pigment, but is the property of each substance itself. Crystals, hexagonal in shape, often have different colors at either end, as pink and green.

In addition to all the colors mentioned, there is also black tourmaline (shorl) and white (achroite).

Besides being used in jewelry, cut in slices tourmaline is most useful for analyzing the polarization of light.

Tourmaline is almost as hard as emerald, 7 to 7.8, and much heavier, and its lustre is also vitreous. Yet it is difficult to take seriously stones which in a tray look like nothing so much as Huyler's "clear squares."

The green tourmaline is the birthstone for May, in Kunz's American list, as is the rubellite for December.

Tourmaline is not expensive now, so frequently is it found, but in 1859 Dr. Feuchtwanger, the eminent mineralogist whose treatise was published by D. Appleton & Co., valued his specimen of rubellite and green tourmaline as high as any gem. He laments that rubellite from Paris, Maine, is becoming very scarce and wants attention paid to obtaining a new supply. A siberite, the fine red Siberian variety, of five lines, less than half an inch, he quotes as worth $150, and one of four by twelve lines, an inch long by a third wide, $1,200.

Think of that, in these days when tourmaline rarely costs more than ten dollars a karat; and emerald, which he rates as low as $12, is now, of good color and quality, cheap at $300!

ZIRCON.

All jewelers are familiar with the precious stones, also some of the semi-precious, but very few know the zircon. Yet this stone, found exclusively in Ceylon, at least in its "noble" form, is in color and lustre the height of beauty. The zircon is not appreciated as it should be. Nothing is, in fact, except by the few, till Fashion sets upon it her important seal.

Zircon, the true hyacinth, is considered by some mineralogists a modern stone, but King's arguments in defense of its ancient origin are very strong. Though his specialty was more particularly carved gems, King's instinct was wonderfully correct, and reinforced by profound scholarship. He is one of the few authorities in the history of stones, separating the ancient from the modern, their material as well as intagli, whom we can trust.

Recent scientific investigators, as well as the archaeologist Westropp in the latter part of the past century, have pronounced all engraved hyacinths found in collections merely hyacinthine garnets. They insist that no zircon intagli, proving its existence with the ancients, have come down to us from olden times. They reckon the zircon from 1789, which, however, is the date of the discovery of the oxide, not the gem. In that year, Klaproth, the German naturalist, produced oxide of zirconia from the earth zirconium, and identified it with hyacinth. What better proof than this that the gem hyacinth was already in existence, even well known, at that time?

King claims that, contrary to the prevailing opinion, many intagli, particularly those by the Greeks, with whom the stone was a favorite medium, have survived to tell the tale. He goes back to Theophrastus, the pupil of Aristotle, writing 400 B. C., to find the first mention of zircon which he considers accurate. It was then called lyncurium, had a fabled origin, was compared to amber, in color and electric properties; but pronounced hard, like a real stone, and cold to the touch, which it is, and amber is not. Several writers after Theophrastus, Solinus, Epiphanius, Isidorus, seem to recognize the individuality of this stone, yet grow more or less confused about it, upset probably by Pliny's fretful impatience with the accepted notion of its origin, that it was the congealed excreta of the wolf, hence lyncurium, a name sometimes applied to yellow amber, sometimes to yellow zircon.

Its home, like the sapphire, was Ceylon; it fell under the classification of Hyacinthus, or yellow sapphire. During the Dark Ages, when art sunk low, the importation of gems ceased, and all in existence were judged solely by color. Engraving did for the an-

cients, in a crude way, what fine instruments do now; determined the degree of hardness, for one thing. But the art of engraving, so high in the Greek period, of a lesser excellence in the days of the Roman Empire, declined steadily from the end of the Augustan period, and with the supremacy of the Goths and Vandals expired.

The zircon has two very remarkable characteristics: its lustre is adamantine, like the diamond; and it is the heaviest of all gems; heavier indeed than any mineral not containing silver, copper, or lead. Its specific gravity is 4.1 to 4.9, and when placed in the densest liquid, where diamond floats, it quickly sinks. Yet while of a brilliant lustre, vitreous to adamantine, more strongly refractive than any gem save diamond, and of great weight and beauty, its hardness is only that of garnet, 7.5. In color, too, it follows the garnet family, having similar hues, if not quite the same.

The zircon is of many colors: wood or dead leaf brown, light and dark olive green; colorless and very pale yellow, like yellowish diamond, with some prismatic play; golden and rich deep yellow, the latter by some jewelers called jacinth; though that term, etymologically, is merely a corruption of hyacinth. The colorless, pale yellow and smoke-tinged stones are called jargoons, at least in Ceylon, and when clarified by heat are sometimes sold as diamonds in the Orient, where the poorly polished are so well liked that the deception is possible. Here, even with the perfect brilliant cut, the play of color is so faint, the movement so slow, that one far from an expert could tell the difference.

The brownish red, prized above all, is the hyacinth of mineralogists, more and more sought for as intelligence increases, and commanding its price. Suffused with the tropic hue of terra cotta, the zircon hyacinth seems a reflection of earth's internal fires. Yet though this is considered the "gem" color, the yellow stones are perhaps more beautiful, when of a fine deep shade. Whatever the zircon may be, always its hard, brilliant, admantine lustre enlivens the color.

Particularly beside its gorgeous yellow does the same in beryl, topaz, even sapphire, far harder minerals, look dull.

Clear, transparent zircon of good tint and size is scarce. Yet for some reason, it is not expensive. It can be bought for about $4 per karat; lovely transparent gems. Only extraordinary size, or great desirability, augment this figure. Surely it is bargain day in zircon. But it is seldom met with in this country except at Tiffany's, where it is cut from the rough or recut from the Cingalese original, always for weight rather than brilliance. Skillful American work immensely enhances its adamantine lustre, and transforms a pretty stone into a wonderful jewel. Little tray at Tiffany's, voicing the color of almost every gem, yet costing so little, what infinite pleasure do you give!

King says: "A perfect jacinth is indeed a splendid ornament, and much superior to the best Brazilian topaz, as having golden lustre mixed with its rich orange. However, it is now completely out of fashion, and consequently of but little value, such are the un-

reasoning mutations of taste in these matters." And that was fifty years ago!

Seldom called for, and its beauty unacknowledged when falling one's way, it yet is of far less common occurrence than the ruby or sapphire, with which it was so long associated, and in whose company it is still found among the river gravels of Ceylon.

Where are the mother rocks of these wonderful Cingalese pebbles, broken from their moorings and worn smooth by the action of the swift, sudden, tropical streams which have carried them far? Ceylon is a small country, open in every part to the traveler. Has the original mountain been swallowed up in some volcanic convulsion, or have the ancient mines, like those of chrysolite in the Red Sea, emerald in Egypt, diamond in India, turquoise in New Mexico, been neglected, over run with armies or vegetation, and finally forgotten?

The hyacinth variety of zircon, or the deep yellow jacinth, is the guardian angel's talismanic gem for September.

GARNET.

The garnet has been known from earliest times, and has always been exceedingly popular. Once it commanded a high price, and was frequently, as well as spinel, confounded with ruby. "Stones of the same color," explains King, "were promiscuously classed under one head by the ignorance of the Middle Ages (unacquainted with even the ancient test of hardness) whence has arisen that strange interchange of names between ancient and modern precious stones so perplexing to every mineralogist."

"Garnet," according to the best authorities, is derived from pomegranate, because of the resemblance of its color to the jelly-like juice surrounding the seeds of that fruit. This is quite as applicable to the ruby, which was also included with the "Granatica," and the spinel. At an earlier date, they were all grouped under the general head of carbunculus, from carbo, a coal, because of their supposed resemblance to burning coal. The modern carbuncle, which is never a specific gem, but always a garnet cut convex, exemplifies this idea to a marked degree, particularly when placed in the direct rays of the sun. Usually, such a stone is cut en cabochon, hollowed out—though as garnet is brittle, it is safer to have the flat bottom—and set against a background of convex gold. This was a favorite treatment for centuries, and is considered artistic at the present time. Wily Asiatics often place colored foil at the back to improve a tint, and deceive the purchaser. It is not safe to buy in the Orient any jewel set with closed back unless the dealer is known as reliable.

"En cabochon" is the French expression for the convex, polished but uncut. While carbuncle usually means garnet mounted in this manner, the term is applied to any stone so cut; which is best for all dark or badly flawed specimens, throwing light into their depths, making them sometimes more brilliant by night than day.

The garnet family is divided into six or more sub-species, which pass into each other by almost imperceptible gradations. They are all silicates of different protoxides or peroxide, combined with alumina, the variations causing the difference in hardness and color, as: the alumina-lime garnet, of which the essonite is an example; alumina-magnesia garnet, otherwise the Bohemian pyrope; alumina-iron garnet, as the almandine; alumina-manganese garnet, the spessartite, from Amelia Court House, Virginia; iron-lime garnet, the black and a variety of the common kind; lime-chrome garnet, the emerald-green ouvarovite of Siberia.

Garnets are easily melted by the blowpipe and some varieties, as the black garnet or melanite, found in the lavas of Vesuvius, seem

to be the direct result of fusion of their ingredients. They are often mistaken for iron ore, and condemned as such, though useful in the manufacture of iron, when understood. Such garnet is found in the Highlands on the west side of the Hudson River.

In recent years, other variations of this large family, even more interesting, have been discovered. The grossularite or gooseberry stone, a pale yellowish green, is seldom found in crystals fit for jewelry nor is the ouvarovite, the hardest of all garnets. But the demantoid, from the Urals, so-called because of its diamond-like lustre, which has nothing to do with its hardness (for it is the softest of all, only 6.5 in the scale, as against 7.5), is perhaps the most beautiful, when at its best, of all. Its soft, brilliant, exquisite green, trembling with loveliness and life, from which intermittent red rays flash out curiously, is far more enchanting than that of the emerald in a specimen clear and of some size. But a karat stone of perfect color and without marked flaws is extremely rare and costly. The many small ones, ranging from quarter of a karat to the most minute, formerly were sold by jewelers as "commercial olivines," which they strongly resemble, when of a light shade. But no olivine can compare with a "gem" demantoid of size, and especially when set in an artistic manner. One such, crowning a ring of rich Roman gold, with pale pink tourmalines down the shank, was exhibited by Tiffany in the Paris exhibition of 1900, as the work of a distinguished artist, and priced at $125.

Particularly interesting to Americans, because discovered by W. E. Hidden and J. H. Pratt in 1898, at Cowie Creek and Mason's Branch, North Carolina, is the rhodolite. Intermediate in character between the almandine and pyrope, one molecule of the former to two of the latter, it yet has a character of its own. The best color is rose pink, seldom inclining to purple, like the almandine, which jewelers often sell as rhodolite, seemingly unaware of the pure rose tint, whence its name, from the Greek roden, a rose. It is without that central profundity which makes most garnets so dark by artificial light, though this disadvantage in fine specimens is more and more overcome by the "spread" cut, giving to a clear garnet of rich color a superior beauty to all red stones save the rarest rubies. The peculiar rose tint of the rhodolite, first, last and forever pink rather than purple, combined with transparence and brilliance, renders it even more striking by night than by day, its lustre being comparable to the demantoid. This, together with its freedom from flaws, makes it a striking and beautiful gem.

But it is very scarce, the first abundance having ceased. Rhodolite is not yet mined extensively enough to stand on its own merits, but when that desirable hour comes all the world will be cognizant of a wonderful gem now known only to the few. Mr. Hidden may be said to be the father of the rhodolite, for it was when mining in a desultory way for the stone which now bears his name that he came across this entirely new variety of garnet, sometimes among the inclusions of true pigeon's blood rubies. What might not happen if the mineral riches of North Carolina were systematically worked,

instead of merely tapped by the enthusiasm of the comparatively moneyless scientist?

Rhodolite must not be confounded with rhodonite, an entirely different substance, 5.5 in hardness.

The most costly, when garnets were more rare than now, with some of the loveliest varieties undiscovered, was almandine. It is almost ruby red, with violet in its depths, the violet shining through the crimson sometimes so pronounced that anciently it was classed among the amethysts. It is the hardest of all garnets, except the infrequent ouvarovite, and the heaviest, 7.25 and 4.3 respectively.

The blood-red or pyrope garnet is found mostly in Bohemia. Usually the stones are small and rose cut, mounted en pave, that is with a flat base, set directly upon the gold—almost always the low grade of 6 karats. If larger stones are mingled with them, perhaps in flower designs, they are cut en cabochon. Pyrope is the Greek word for fire, though this garnet more resembles the color of Burgundy wine. Almandine is also found in Bohemia, near Kollin. But the occurrence of garnet in all Europe is unimiportant. The ancient almandine was almost exclusively Oriental, from India and Ceylon.

Guarnaccino, the name for a favorite with the Italians, is said to be of a color midway between the jacinth and the garnet, combining the orange of the one with the red of the other. It is from the word vernaccia, meaning red wine. "A splendid stone, of great lustre," says King, "and when of the first quality can with difficulty be distinguished from the browner tinted spinels."

One begins to wonder, amidst this bewilderment of colors, if the guarnaccino, the hyacinth and the vermeille are not different tints of the essonite, known best by the cinnamon-stone of to-day. The hyacinth certainly is an essonite, sometimes yellowish-red, as in Ceylon, sometimes orange from Lower California or reddish brown, resembling the flawed spessartite in color, only a thousand times more beautiful.

Garnet is found in Australia, where it was first supposed to be ruby. Like the "Cape rubies" in South Africa, which went through a similar experience, these Australian stones are called "Adelaide rubies," and are considerably valued in the Orient and Russia, more so than in America, where equally fine garnets are not uncommon. Arizona and New Mexico produce many, locally termed rubies, with the prefix of the two States, which both by night and day are exceedingly brilliant, superior to the "Cape rubies," and often more beautiful than many of the true rubies of Burmah. In Montana, where in company with sapphire ruby was so confidently expected, beautiful red garnets seem for the most part to have taken its place and borrowed its name. "Montana rubies" *may* be the real thing, but sometimes they are not.

The lustre of the garnet is vitreous, and it is easily chipped. Intagli upon it are not very common, the ancients valuing it more for its color. Besides, its brittleness under engraving endangered the stone.

Garnet has been through all ages the birthstone for January, and in carbuncle form it is the talismanic gem of the guardian angel for May, while jacinths or hyacinths perform the latter office for September.

The garnet in olden times was the emblem of constancy, gave and preserved health, reconciled differences between friends, protected from perils by land and sea, kept off plague and thunder. It also brought grace, dignity and victory to the wearer. It was endowed with every peculiarity pertaining to the ruby, turning dark when danger approached, and resuming its original brilliancy when the danger was past.

Even in these days it is considered a great help towards success, also a valuable protection against the accidents of travel. Every tourist should wear a garnet!

HYACINTH.

Three various kinds the skilled as Hyacinth name,
Varying in color and unlike in fame:
One, like pomegranate, flowers a fiery blaze,
And one the yellow citron's hue displays;
One charms with paley blue the gazer's eye,
Like the mild tint that decks the northern sky:
A strengthening mind the several kinds convey,
And grief and vain suspicion drive away.

If I could earlier have come across these lines of Marbodus, it would have saved me a long confusion. They embrace a fact of the first importance: namely, that hyacinthus during Roman times covered the whole family of corundum; rubinus hyacinthus, red hyacinth, or ruby; sapphirus hyacinthus, blue hyacinth or sapphire; and a yellow variety, citrinus hyacinthus. As the art of gem engraving declined, the ruby and sapphire became known by their adjectival terms, while hyacinthus, loosely applied to all the yellow stones then in existence, wandered on. To run this down it was necessary to fly from a casual reference to cyclopedia, to history, to mythology, to poetry—with a final corroborative appeal to Tiffany!

How hyacinthus could mean both blue and yellow, suddenly became crystal clear. Also how the zircon, Theophrastus' lyncurium, or ligurian, the ligure of the High Priest's Breastplate, disappeared from among gems. That so wonderful a stone, indubitably Oriental, could have hidden itself completely was a mystery. Or that, exclusively from Ceylon, whence gems have come as long as gems have been known, it should not have been discovered till 1789.

An interesting side issue of the flower which sprung from the youth Hyacinth's blood, as told in the chapter on Sapphire, concerned the word Tyrian. Evidently, like myself, more than one searcher for light judged the color of the blossom, born in blood, to be of a similar hue. But blood drying where it falls is not the crimson of the fresh arterial flow; it is brown tinged with red—indeed much like the gem hyacinth to-day. The reference to Tyrian dye as the hue of the flower upset all calculations till I discovered that Sir Humphrey Davy, examining a substance in the Baths of Titus, which in its interior had a lustre approaching carmine, considered it a specimen of the best Tyrian purple!

Thus, "her hair in hyacinthine flow," otherwise auburn, became probable, and we all were happy, especially those who believed the flower was the tiger-lily, surely the same general color as the gem. The believers in the fleur-de-lys, as it turned out, were to have their innings later, through "the purple sheen of the raven's wing." In the end we all found ourselves right in one way or another. With

a stone like the sapphire, running the whole gamut of color, all things are possible.

The awakening interest in the hyacinth and the difficulty of knowing it when seen is not confined to the amateur. Jewelers are as apt to be mistaken about it as the least of their customers. Mineralogists alone recognize its distinguishing features, and even they are but little acquainted with its history.

It took me, studying alone, many weeks, if not months, to understand one simple thing: that the hyacinth, when not a flower, is a *color*—rather than a distinct precious stone. A certain shade of the garnet as well as the zircon, *and nothing else,* is a hyacinth as now known to the world.

It was finding things for oneself, learning at first hand, an instruction like no other; the first perception of truth to one who has taken everything for granted.

The French "hyacinthe" comes from the Italian "jacinto," formed according to the usual rule from the Latin hyacinthus, in its turn from the "jacut" of the Orient, maybe. Dropped from the sapphire and ruby, "hyacinthus" clung to many stones of superior hardness till rescued by mineralogists for the zircon and garnet families alone.

The zircon gives what the mineralogists call the true hyacinth, in distinction from the essonite garnet, largely sold as such. They are of a common hardness, about 7.5, the essonite a trifle softer, but the zircon is a clean terra-cotta, and of far more brilliant lustre. To whichever of these two the hyacinth may belong, its yellow must border on orange, its red on brown. In the zircon this is very marked, but the garnet varies in its tints: the cinnamon-stone is reddish brown, almost the color of certain topazes; the spessartite a dull shade of cinnamon, and full of impurities; the Cingalese essonite, also much flawed and generally turbid, is yellowish red; while in Lower California, there is found an orange, sometimes faintly red at its base, which is the most seductive of all. It is strongly akin in color to beautiful red hair.

Some have called the zircon of a fine imperial yellow, often with a tawny tinge in its rich depths, jacinth; reserving hyacinth for the brownish red variety; but the terms are usually synonymous.

The resemblance between Spanish topaz, or burnt citrine, and hyacinth is very strong. Some of these products are as red as the Cingalese essonite, others much like the cinnamon-stone, only far more clear and brilliant. It is just because of this clarity, in fact, that one can easily decide between them. Then the pseudo-topaz, being quartz, is softer than garnet.

The hyacinth seems peculiarly autumn's stone, in harmony with turning foliage. A northern forest early in October manifests the composite beauty, the Oriental moderation, of its rich tones. Set between brown diamonds, the browner and "dirtier" the better, it forms a color composition altogether enchanting.

Nowadays the hyacinth is nobody's birthstone, though in the seventh century, and later by the Russians and Italians, it was used

for January, but it is not without its niche, under the name of jacinth, as the talismanic gem for September.

In the Middle Ages the hyacinth was supposed to have the power of procuring sleep, riches, honor, and wisdom. Also it drove away plague and evil spirits. Cardanus, writing in the sixteenth century, said he was accustomed to carry a hyacinth about with him for the purpose of inducing sleep, which "it did seem somewhat to confer, but not much."

PERIDOT.

As the green garnet beside the emerald shows a yellowish cast of green, so the peridot beside the green garnet carries the tone to a point where green so mingles with yellow that you hardly know whether you are looking at yellowish green or greenish yellow. There are peridots from Egypt of a dark olive green, rich in color and large in size, but the majority come from New Mexico and Arizona, small and brilliant when diamond cut, of an ethereal tint very lovely in company with other stones or richly wrought gold, but scarcely strong enough to stand alone. These the jewelers call chartreuse green.

The peridot, olivine, chrysolite—for they are identical in composition—is a soft stone, less than quartz in hardness. A careful lady might wear one in a ring and keep it in good condition a long time, but it is more suitable for necklaces, lorgnettes, pendants and the like, where friction is at its minimum. Set deep in Roman gold, to protect it and also bring out its dainty, dancing, springlike light and coloring, it is not lacking in either beauty or distinction. The golden green of the chrysolite is a whole world away from the green of the emerald, even when the latter is light in shade, but many prefer it, as more in harmony with modern colors.

The true chrysolite, with which the olivine and peridot have been classed, is a very ancient stone, at one time of more value than the diamond. That it even exists at present is doubted by high authorities. No chrysolite suitable for cutting is now found in nature; authentic material of the name in the market is derived from old ornaments, and could have come from no mine now known to man; the deposit was probably exhausted or the mines abandoned and their exact location forgotten. The ancient mines were on the Island of Topazius in the Red Sea, about which hung many a fabled story, particularly in regard to this gem. It was called topazius in those days, but the description applies to the modern chrysolite or peridot. Our topaz was unknown to them.

According to Pliny, the topazius came from the Red Sea, was of a bright greenish yellow, the largest of all the precious stones, and the only one of high value yielding to the action of the file, the rest being polished by the stone of Naxos, or corundum, otherwise emery. Like our peridot, it was so soft as scarcely to scratch glass—too soft for serviceable engraving. Greek intagli on it are rare, the Romans seem not to have used it at all, but modern works in it abound.

Under the head of chrysolithos during some periods were classed many yellowish green stones, and some pure yellow. This

practice obtains even to the present day, in the loose phraseology of the trade. The transparent chrysoberyl of Brazil is often called chrysolite, though chrysoberyl is the more expensive stone; Ceylonese chrysolite is tourmaline of a yellowish green color; Oriental chrysolite, yellow green sapphire; Saxon chrysolite, greenish yellow quartz. Modern mineralogists have at last succeeded in differentiating them, but it is still exceedingly difficult by the color alone, which was almost the sole test for many centuries, to tell green yellow or yellow green stones the one from the other.

Peridot varies in hardness from 6.5 to 7, and in specific gravity from 3.2 to 3.7, and the lustre is vitreous to greasy. The greater the amount of oxide of iron, the heavier and the deeper in tint. Some time ago, when green garnets were cheaper, they were sometimes sold as "commercial olivines," but that mistake would hardly be repeated these days, when the rare green garnet commands many times the price of the plentiful olivine. Though similar in weight and hardness, the demantoid is infinitely more beautiful in hue, and its lustre adamantine, with fugitive red flashes, as against the peridot's shimmering golden light.

While its hardness is low, the peridot takes a good polish, particularly when treated with sulphuric acid, but its liability to show wear has hitherto prevented its extensive use. However, the increasing vogue for colored stones, and the general fondness for green, has swept it along with the tide; but more than anything, the restoration to its ancient place as the birthstone for September has caused eager demand and sent the price soaring. Ten years ago a karat peridot from New Mexico or Arizona could be bought for $3. The new stones coming in command nearly double. So potent is one little word from on high.

The peridot is remarkable as being the only precious stone that has literally dropped from heaven! It is found in meteoric iron, a union of nickel, cobalt and other metals, but totally unlike any composition on earth, and which could not be manufactured or reproduced, in any such quantity as the Peary meteorites, for instance, by the most ingenious man born. It is practically steel-iron. Only occasionally in meteors has there been a peridot as large as one karat, though under such conditions it occurs transparent and of fine color—in truth a celestial gem.

While widely distributed as grains, or granular masses, the occurrence of peridot crystals is more or less rare, or was previous to the discovery in our West.

Peridot differs from almost all precious stones in its oneness of color. No other tint than yellow is ever mingled with the green of olivine, peridot or chrysolite. Chrysolite proper is defined by some authority as of pale yellowish green; peridot, deep olive green; olivine, between the two; but the terms are changed from year to year according to fancy. They might all as well be known as light, dark, medium peridot, green or yellow predominating according to the specimen. Because of its scarcity, chrysolite was once highly prized. It was one of the few ancient stones, like beryl, valued for

itself. Even now, if of brilliant cut and large size, it reaches into the hundreds.

The chrysolite was once used by all nations as the birthstone for September, but in the eighteenth and nineteenth centuries the sapphire prevailed. The twentieth has witnessed a reversion to chrysolite, which is said to gladden the heart (its revival certainly has gladdened the heart of the jeweler), while sapphire inculcates truth, virtue and constancy. Both are supposed to be efficacious in curing diseases of the mind.

An old book says peridot cools passion, calms madness, augments wealth, averts sudden death, and gives faith, all of which desirable qualities go with the sapphire also.

Chrysolite exercised a cooling power over purely material things not less than tumultuous emotions. If held in a pot of boiling water, it would so decrease the heat that the hand when thrust in would not be scalded.

Like the ruby, it would grow dull before poison, and recover when the poison was removed. Powdered chrysolite was a remedy for asthma, and held on the tongue in fever lessened thirst.

Found on the Island of Topazius in the Red Sea, it was not discernible by day, but shone at night. Patrols hunting for the gem after dark would cover with vases each luminous spot, returning the next day to cut out the precious rock. So the legend ran.

SPODUMENE.

Spodumene or triphane, belonging to the pyroxene group, at first was supposed to occupy only one locality in the world—Stony Point, Alexander County, North Carolina. The specimens looked like olivine, but were harder, 6.5 to 7, specific gravity about 3.18, and lustre pearly to vitreous. Later, they were found to be identical with a fine transparent stone, taking a high polish, discovered in Brazil, and ignorantly sold in Europe as chrysoberyl. The two are much alike in appearance—a pale yellow or yellowish green. Many so-called chrysoberyls in Brazil, often termed Brazilian chrysolites, may turn out to be spodumene. Spodumene is fibrous and tough, in this respect something like jade. Yet, it is difficult to cut on account of its very easy cleavage, being harder in one direction than another. Because of this, though much harder, it is almost as perplexing a lapidistic problem as sphene. Particularly is this the case with the variety called Kunzite.

HIDDENITE.

A variety of spodumene, discovered in North Carolina in 1879, at Stony Point, now called Hiddenite, as well as the gem, is named after W. E. Hidden, who discovered it. The first specimens were thought to be diopside, being transparent and greenish yellow in color. Some of almost an emerald green, growing deeper in tint the deeper they dug, were by Mr. Hidden at first called lithia emerald, an essential constituent of spodumene being lithia, until the scientific world determined to honor the discoveror himself. Yet, though likened to emerald, even the greenest of them have a tinge of yellow, and the hardness, 6.5 to 7, as well as the color, is inferior to emerald. Hiddenite is exclusively an American product. A fine green transparent stone is very rare, but can be seen in both the American and British museums. It is worth from $50 to $100 per karat and was in great demand when first found, but the supply was soon exhausted. Yet the earth in that locality has only been scratched, and some day a fortune will fall to one possessed of both means and patience. For green stones are in increasing demand, and Hiddenite is only a shade less beautiful, if a whole degree less hard, than the most costly gem in the market.

The spodumene first seen by Mr. Hidden (even then, in 1879, an eminent mineralogist) were in the cabinet of Mr. Stevenson of Statesville, N. C., to whom they had been given by children, finding them while at play in a field. Having been long on the surface they were pale and faded, and Mr. Hidden thought them diopside, but sent them to J. Lawrence Smith, who judged them to be kyanite. Mr. Hidden asked Mr. Smith to examine them more carefully, when

the latter returned the verdict of spodumene, or triphane. Being neither a mineralogist nor a financier, Mr. Stevenson seemed not interested in the subject and declined to put either cash or vitality into a scientific search by Mr. Hidden, who finally, in company with Mr. Pratt, mined and succeeded in bringing to the light the totally new variety of brilliant emerald green so long concealed from mankind, and in other ways proved North Carolina's wealth of minerals.

KUNZITE.

The most conspicuous variety of spodumene to-day is the amethystine, recently discovered in California, at Mesa Grande, in San Diego County, and named for Dr. Kunz. The color of Kunzite is very nearly that of the pink topaz, a delicate light rose, tinged with lilac.

It takes a good polish and cut brilliant makes a very artistic ring stone, much more so than amethyst, at about the same hardness, but is lighter, and of an entirely different constitution.

When Kunzite was first found near Pala, in Southern California, and was sent to New York, it was not recognized as spodumene, but thought to be tourmaline, previously discovered in that locality. Examination showed the crystals to be remarkably like Hiddenite from North Carolina, differing only in color, and with the lithia minerals it was finally placed.

"If sufficient differences are found to exist between this spodumene and the other known varieties of it," says Dr. Kunz, in the American Journal of Science, 1903, "a new name will be given to it."

Differences were thought to exist, Charles Baskerville proposed, in a note to Science, the name of Kunzite, and Kunzite it is to this day.

Still, it is remarkably like Hiddenite in almost every essential, except that of color, which is no real difference. Sunlight tends to fade its delicate lilac pink. At great depths it is often a rich deep purple—just as Hiddenite, the farther you go down, is a richer, deeper green. Under the X-rays it exhibits strong phosphorescence.

In hardness it is about 7, equal to quartz, but lapidaries are often unsuccessful in cutting it, the cleavage being very easy, causing it to flake.

Kunzite is on the American list as the natal stone for September.

RHODONITE.

Rhodonite belongs also to the Pyroxene group. It is a manganese spar, used largely in Russia as an ornamental stone. It is very tough, hardness 5.5 to 6.5; specific gravity 3.6 to 3.7. It is transparent to opaque, lustre vitreous, found sometimes in large pieces, and is always cut en cabochon. The color is flesh red to light rose red, somewhat ruby-like. In appearance it resembles rose quartz. It is found in the Ural Mountains, in Persia and near Cummington, Mass.

JADE.

The word jade is magical in itself. It calls up first a narrow, curving street in Singapore, within whose low, crowded shops, frequented exclusively by Chinamen, looking anything but luxurious, there was enough jade on sale to stock a nation. At this pivotal point all ships and all races meet, but trade is carried on largely by the Mongolian, and to him there is no bracelet more beautiful, no ring more desirable, than one of jade. And he is half right, too.

Another picture is of Rangoon, Burmah. Here too we were looking for jade. Out of the depths of the little shop, as we were leaving without purchase, came a smiling Chinaman, hitherto unseen, wearing a short silk sack of an indescribable color, and bearing in his hand a jade bracelet of exactly the same hue!

Our hearts jumped; for never had we seen a piece so beautiful; a perfect monotone of the most wonderful gray-blue; like the superb masses of clouds piled high in the eastern horizon when the glory of sunset is upon that Oriental land.

The man knew he possessed a gem, rarely seen, scarcely known; and backed up by the rich brocade, its charm was doubled. Needless to say, he obtained the twelve American dollars from which he would not abate one penny, though we walked some distance away before finally surrendering.

Later, in Ceylon, a star sapphire was obtained, as like the bracelet in elusive coloring as a daughter is sometimes like her mother.

What artists are these Orientals! Here was one of the rarest tints in the world. Yet the Chinaman had matched it in his rich garment, and at Colombo its worthy companion was found in a shade of corundum.

The nephritoids embrace nephrite, jadeite and chloromelanite. Both in French and English these are always referred to as jade. Nephrite belongs to the hornblende group; jadeite and chloromelanite to the pyroxene. In spite of the fact that they are classed mineralogically into two groups, they resemble one another closely. Their hardness is as a rule scarcely that of quartz, but on account of a fibrous structure, the stones are exceptionally tough and more difficult to fracture, for commercial purposes, than any other in the mineral world—particularly nephrite. Nothwithstanding its fibrous nature, the substance in each case, when polished, appears to the naked eye perfectly homogeneous, with rather the appearance of fused material.

Nephritoids are opaque, or at most translucent. Sometimes they are brightly colored, but as rule are inconspicuous green, gray, or white. They have always been highly esteemed by primitive peo-

ples. Nephrite in New Zealand is worked by Maoris, and jadeite in Burmah by the Burmese, in the same way as by the inhabitants of Europe in prehistoric times. Jade holds first rank in China, where it is called "yu" and used not only for personal ornaments, but for vases, sword handles, plates, bowls, idols and the like.

Nephrite is known as axe-stone, because frequently found fashioned into axe-heads; and also kidney-stone, worn as a charm against kidney diseases, whence its name. Rings are cut out of it solid. The composition of nephrite is exactly the same as actinolite, in the Zillerthal, Tyrol. Hardness, specific gravity, cleavage, color agree perfectly, but the fibres of nephrite are finer and more compact. Never found in crystalline form, it occurs in large blocks, which cannot be broken as a whole by a hammer. They must be subjected to sudden changes of temperature, heated, then suddenly plunged into cold water. By this means, it is made to crack, when a blow finishes the job.

Ancient prehistoric implements are found mostly in Switzerland, near Lake Constance, Zurich, Brienne, Neutchatel, left by cave-dwellers. Jadeite remains are more common all over Europe than nephrite.

In China, the favorite variety of "yu" is a pure milk-white, with a soapy lustre and *feel*. Pebbles of this quality run as high as $150. A small green stone, suitable for a seal, will fetch the same from a Chinese merchant in Burmah. The task of working such material is arduous. It is not cheap in China; still less so in Europe —particularly when carved.

Chemically, jadeite is similar to spodumene. The microscope shows an irregularly interwoven mass of fine fibres. Hence its toughness. Jadeite in itself is colorless, and many natural specimens are almost white. Often there is a tinge of rose-red or some light shade of color, such as pale gray, greenish white, bluish green, leek green, apple green. Some are white, with more or less sharply defined spots of fine emerald green, due to the presence of a small amount of chromium. A uniform shade of pale green is due to iron. Jadeite is found in Upper Burmah. The best specimens are from river boulders, but it is also quarried out of solid rock At the quarry fires are lighted, then the blocks are cooled by night air, which renders them more easily broken up, but it injures the specimens. Most of these are sent overland by mules to China, but some find their way to Lower Burmah, where minerals in a natural state are wholly absent.

Nephrite is found mostly in Asia and New Zealand. There is some in Alaska, but jadeite is more common in America, as well as Europe. In the rough, chloromelanite never yet has been met with. Always it is found in ancient articles, accompanying jadeite implements, in France, Switzerland and Mexico. It may be considered a jadeite rich in iron, and of a correspondingly dark color, a green which is almost black.

Much of the jade that comes from China is said to be prehnite, whose hardness is not above 6.5, sometimes lower, and specific grav-

ity only 2.9. In hardness the nephritoids run from 6.5 to 7.5, specific gravity from 2.9 to 3.18, lustre vitreous.

Californite, a compact massive variety of Vesuvianite, of various shades of green, is much like jade in hardness (6.5), composition and appearance, and can be used much the same way.

The Bishop collection of jade at the Metropolitan Art Museum is known the world over. Mr. Heber R. Bishop was engaged in mercantile pursuits, principally sugar-refining in Cuba. During the revolution of 1873, he foresaw endless trouble, and closed out his business for far less than its value. He returned to New York, nevertheless, with a considerable fortune, and settled down at Irvington-on-Hudson, dying December 10, 1902.

Not only did he present the Museum with his remarkable collection of jade, the result of a lifetime of search, together with a book describing it worth itself $100, published privately and given away to various public institutions in limited quantities, but he gave the Museum $55,000, to cover the cost of finishing the Bishop room as he desired. It is the finest Louis Quinze room to be seen anywhere, foreign artists pronouncing it the most magnificent in existence, excepting those in the palace at Potsdam and Versailles. Moreover it is a reproduction of the donor's own ball-room.

SPHENE.

Sphene, or titanite, is a mineral from the ore of the metal titanium. The gem, generally a yellowish-brown mineral, the dark more valued than the light, is found in wedge-shaped crystals, whence its name from the Greek sphen. It occurs in Switzerland, sometimes Brazil, infrequently in Vermont and New Hampshire, in long needles enclosed in masses of transparent quartz.

The sphene is soft, only 5 to 5.5, lustre adamantine to resinous, and cuts with difficulty, but a successful brilliant is so unique and scarce that even if very small it commands a good price, say $50 a karat. It is the fine rare flower, blooming at long intervals, of a common ore, which in one form, rutile, resembles coal, and when cut suggests the black diamond. Titanic ore is fairly plentiful in mass, but seldom gives birth to a crystal of gem quality.

Intensely dichroic, the sphene's coloring is peculiarly mixed, red or green flashing with diamond-like quickness and brilliance from the yellow-brown body. While not really like any other stone, it yet slightly suggests the brown diamond. The body of the sphene is less brilliant, but the scintillating colors are more rich and rare. Yet its softness, notwithstanding its lustre, which resembles that of the green garnet, forbids hard usage.

TURQUOISE.

The turquoise is exquisite as a decoration, but doubtful as a jewel. In the first place, it is not a stone, either precious or semi-precious, but simply a substance—a process; similar to the opal, whose origin we forgive for the sake of its wonderful color effects. The turquoise, one flat shade of greenish blue, is becoming to scarcely any face or hand, but beautiful when encrusted on wrought gold, as in thimbles, watchcases, and the like. As ear ornament or brooch it is questionable, particularly when surrounded by diamonds. No complexion, except the very freshest and free from admixture of red, can stand the turquoise, and it must be used sparingly even by the young. It is in harmony with but few types, one, strange to say, the young-old face, past the blushing period, framed in fluffy gray hair; and the dark brunette in whose complexion there is a suggestion of blue.

Turquoise is unique in belonging to the phosphates—the only ornamental stone given out by that group. In hardness it is about 6; specific gravity 2.6 to 2.8—both light and soft. It is opaque, never found in crystals, has little lustre, and that waxy, and is always cut en cabochon. Its beauty lies solely in its color. This is mostly green, only the finer specimens being blue, and these often turn green with age—when they are still better liked by some. The ancient Mexicans thought as much of the green as the blue, and the natives of to-day wear the green in preference to the blue. A gem of soft greenish blue, as the sky or sea sometimes looks on perfect summer evenings, is certainly very lovely. The color is said to be affected and improved by the warmth of the body.

Like the opal, it is found filling up cavities in the interior of rocks. Its formation follows the decomposition of feldspar crystals, of which it often takes the external form. The "old rock" is said to retain its color perpetually; the "new rock" fades, or changes to green. There is also fossil turquoise; not true at all, but fossilized bone, tusks or teeth of the mammoth.

The best turquoise is found in Persia. On the eastern slope of Ali-Mirsai, a peak in a chain of mountains over 6,000 feet high, are stones of a beautiful dark blue. Also pale blue and green. There, with the village of Maaden as a center of trade, the Persian Government mined with success till 1825, when the people of Maaden took hold. From that time the industry declined. The stones in alluvial detritus, having a white coat of weathered material, are said to be specially fine in color. This usually is permanent, but in some of the newly opened mines there is turquoise which a short time after

being exposed to the air turns white. Preserved in damp earth it is sold to unsuspecting travelers who get "stung."

In the Sinai peninsula, there are many poor, whitish stones, and some equal to the best Persian. These are usually sold as Turkish or Egyptian turquoise. They are found at Moses' Wells, the quarantine station for westbound ships through the Suez Canal, nearly opposite the town of Suez.

Beautiful stones of robin's egg blue, as well as pure azure, have recently turned up in New Mexico, Arizona, California and Nevada, to say nothing of green. These deposits are now being worked scientifically by Americans, and are proving to be among the finest in the world. The American product is rapidly growing in favor, and large quantities are shipped to Europe, where it finds a ready sale among cutters.

Mexico was once a part of the ancient kingdom of the Aztecs. Turquoise is supposed to be identical with the green precious stone chalchihuitl. William P. Blake, who re-discovered the old turquoise mines, on the mountain named after the stone, in the fifties, says it is known to the Pueblo and Navajo Indians of the present time as chalche-we-to, supposed to be a corruption of the old name. This mountain forms part of the group Los Cerillos, 22 miles south of Santa Fe. That these mines, worked long ago by Europeans, as the remains show, are of great age is proved by pines, cedars and other trees, hundreds of years old, growing on the sides of the pit. Ancient tools of various kinds were found. The debris covered twenty acres, with large trees growing on it, and everything pointed to the fact that exceeding pains had been taken to conceal the exact location of the mines, all having been carefully covered up before abandonment. This action was caused by a national disaster which befell the Indians in 1680. The ground being undermined by the miners, a large section of the mountainside suddenly fell in, killing many workers, and causing the uprising of the Pueblos, which resulted in the expulsion of the Spaniards.

Not far from Los Cerillos, but across the border in Old Mexico, are immense turquoise deposits, much of the finest sky-blue, owned in turn by several Americans, one the mineralogist, W. E. Hidden, who indulged in that form of athletics known as "jumping the claim"; but it is a rough, barren country, similar to the opal region in Australia, and being surrounded by desperadoes, and thirty miles from the nearest water, as a commercial proposition it seems wellnigh hopeless.

Work attempted the latter part of the last century in various New Mexican mines, including the one subject to the great disaster, proved the turquoise to be of poor quality, mostly green, and though some money was made, the venture was gradually abandoned to the Indians, whose methods are like the Burmese with jade, burning the weathered rock for excavation, thereby injuring or destroying the turquoise. Good blue is seldom found, and on account of a fraud perpetrated, green turquoises being turned into those of the

best color by a surface application of Berlin blue and placed on the market as high-class stones, the trade let them severely alone.

The turquoise of the new mines in our West change color within six months if at all. Blue, either sky or robin's egg, surviving the first half year's exposure to the light, so far as experiments have gone, is permanent. The fancy of the public for the robin's egg tint is said primarily to be due to an important jewelry establishment being "long" on that shade and very "short" on the gem color; hence fashion was directed into the proper channel!

The artificial composition of turquoise is very successful. Stones have been obtained of exactly the same composition and best blue color which can be detected only by destroying the stone. True turquoise burns to a powder, but artificial runs together in a solid mass, retaining its blue color in the interior. Another test is to put it in water, let it lie in it some time, when the false is said to assume a darker shade of blue, and on the wet surface can be made out a net work of cracks. A less expensive enamel is easily detected by scraping the side with a knife. If the true, it will flake; if not, it comes off like powder. The blue of the artificial product never turns green, and many jewelers and their customers prefer them on this account, but they have a hard expression, by no means engaging. A thousand times the real green, even of inferior quality, than the artificial blue.

Turquoise matrix is almost as much in favor as opal matrix, but it is less durable. Beautiful at first, the pieces soon fade and fall out.

Turquoise is the birth stone for December among the Poles and Russians, the latter also using the chrysoprase; but with other nations, Jews, Romans, Isidorus, and Italians it is the ruby. The turquoise is supposed to bring prosperity. It is a soul cheerer. Like the opal, it was thought in olden times to change color if the wearer became ill, and regain it on recovery. It was also the favorite gem of equestrians, preserving them from falls; and was affected by the married, since it removed enmity after marital quarrels.

QUARTZ.

The quartz group, with all its divisions and ramifications, is so large as to appall one. While so widely distributed over the earth's surface as to seem a mineral of the most common kind, at its highest and best its crystals rank as semi-precious stones, and even in its various opaque forms it was greatly valued by the ancients, not only as an ideal medium for their camei and intagli, but as a personal decoration.

Quartz is 7 in hardness, specific gravity 2.6 to 2.7, and lustre vitreous to resinous. Therefore its "gem" forms, cairngorm, smoky quartz, citrine, frequently metamorphosed by heat into the so-called Spanish topaz; amethyst, rose quartz and rock crystal are in reality harder than the opal, turquoise, peridot, to say nothing of coral and pearl, classed with precious stones.

Under the head of compact quartz, succeeding the crystalline, comes chrysoprase, translucent but not transparent, and always cut en cabochon. It is of a lovely apple green color which, like the rose quartz, upon long exposure to the light, is apt to fade.

After the compact quartz, of which chrysoprase is the star, though "there are others," comes the long chalcedony group, with its pretty spots and interesting bands, including onyx, agate, the bloodstone and carnelian. Chalcedony might be said to be a pictorial quartz, with markings for beauty instead of bright lustre. The carnelian, a brownish-red variety of chalcedony, was called by the ancients sard, and in its soft color and polish, exactly what such a stone requires, was lovelier far than with the hard shine of to-day, when it goes through all sorts of unnatural experiences at Oberstein. Sardonyx is carnelian or sard in three distinct layers, usually red, white and brown.

The carnelian, or sardonyx, is the birthstone for August, insuring conjugal love. It gives courage and according to Marbodus:

> Fate has with virtues great its nature graced.
> Tied round the neck or on the finger placed,
> Its friendly influence checks the rising fray,
> And chases spites and quarrels far away:
> That where the colour of raw flesh is found
> Will staunch the blood, fast issuing from the wound:
> Whether from mangled limbs the torrents flow
> Or inward issues, source of deadly woe.

The mocha-stone of India, as well as our moss-agate, is of the chalcedony group. Both are hard, tough and beautiful, and contain green or brown mineral matter (oxide of iron) having an appearance of vegetable growth, branches, leaves and moss, against the water-white background of pure chalcedony. In a different way it is as pleasing as jade, and even more durable, for jade is brittle.

The agate is the birthstone for June, and talismanic gem of October. It signifies health, wealth and longevity. In the words of Marbodus:

> The agate on the wearer strength bestows,
> With ruddy health his fresh complexion glows;
> Both eloquence and grace are by it given,
> He gains the favour both of earth and heaven.

The bloodstone, or heliotrope, a deep green chalcedony, with red spots (oxide of iron), is the birthstone for March, and well does it serve its wearer, for it gives him or her courage, strength and wisdom. Also, according to Marbodus:

> It gifts the wearer with prophetic eye
> Into the Future's darkest depths to spy.

About this same stone the Greek Orpheus says:

> Through it the eye-balls with fresh lustre shine:
> E'en impotence it cures if mixed with wine.

The amethyst, best known of all the quartz group, and the most valuable of its gems, varies in color from deep purple to pale lavender. Excellent specimens are quite plentiful in the United States, but the finest quality is from Siberia, a rich royal purple with a tinge of red. Some from the Ural Mountains, of a fine color, like the alexandrite, turn red by artificial light. Many of a splendid tint come from Virginia, North Carolina and Brazil.

Amethyst was once greatly valued, not only by the ancients, but comparative moderns. Queen Charlotte's necklace of well-matched stones, though only of common variety, was appraised at $10,000. Now, for itself, it would hardly be worth $500. The ancients valued the amethyst not only as a perfect medium for intagli, being both hard enough and soft enough, but because it was a charm against intoxication, to which the Romans, with their Lucullan feasts, were prone. Wine, therefore, was often drunk from amethyst cups.

Deep violet is the favorite tint to-day, but while the ancients were very susceptible to the imperial purple, particularly when, like the Tyrian dye, in its depths lurked crimson, they considered the pale stones, slightly tinted with lilac, the most lustrous.

Amethyst is the birthstone for February, as well as the guardian angel talismanic gem for November. Its office is to promote deep love not less than prevent intoxication.

Quartz balls in the past as at present were used for purposes of divination. The custom originated in India, but is popular with the old mammys of our South. Moonstone balls are supposed to have their efficacy, too.

The potency of a birthstone is thought to be increased if the natal day corresponds to the zodiacal sign, which is not always the case, the signs overlapping in the latter part of each month, constituting the "cusp," partaking of both signs, under which genius is apt to be born, according to astrology.

But this is a separate study, involving the influence of the zodiac on human life, with ramifications of its own.

MOONSTONE.

The feldspar group flowers in the moonstone, the commonest semi-precious stone in Ceylon, valued far more here than there. In Colombo moonstones can be bought for a few pennies each, a handful for the English pound. Fine, clear stones, translucent but never transparent, blue, gray or colorless, with a peculiar sheen, cut always en cabochon, are really very lovely. The blue are the most rare, scarce even in Ceylon, the only ones which command a price there, though hardly more attractive to strangers than the gray, in its soft, gentle, mysterious opalescence. When cut in a high dome or in balls, the spot of light follows the eye like the play of light in a drop of water suddenly congealed, but more poetically likened to the luminosity of the moon. This is admirably reproduced in ground glass imitations.

Adularia is the same stone when white and colorless and subtransparent. The hardness is 6 to 6.5, specific gravity 2.4 to 2.6. It has light green and red tints, as well as blue and pearly gray. Sometimes the play of light shows green or red floating on a gray background. But that best known to jewelers is either gray or blue.

It is found at Mount Adula, Switzerland, in the Scandinavian Peninsula and the United States, to a small extent, but the great deposits are in Ceylon, where it occurs in granite rocks.

Moonstone is an alternative August birthstone for those who do not care for sardonyx or carnelian. In the Orient it is a sacred stone. It signifies good luck.

> With the loved moon it sympathetic shines,
> Grows with her increase—with her wane declines;
> And since it thus for heav'nly changes cares,
> The fitting name of sacred stone it bears.
> A powerful philter to ensnare the heart,
> It saves the fair from dire consumption's dart.
>
> *Marbodus.*

SUNSTONE.

Another form of feldspar is sunstone, unattractive and seldom used as an ornament. The public prefers the goldstone, a manufactured article, but more interesting than the stone it simulates.

AMAZONSTONE.

Amazonite bears a strong resemblance to jade, but is really a feldspar, found along the banks of South America's great river. It is used to a limited extent in decorative jewelry.

LABRADORITE.

A score of years ago a beautiful greenish blue substance was found in Labrador, at first thought to be a form of onyx, but eventually identified as feldspar, and made into various household articles by the Tiffany Company.

LAPIS LAZULI.

Lapis lazuli is a magnificent blue stone. Fine specimens are used sometimes as gems, and their color is far more intense than that of any other opaque blue stone. The sapphirus of the ancients was lapis lazuli, not the specimen of corundum now bearing that name. For centuries this stone was prized above all others, and for the beauty of its color alone. This was the standard to which all blues were compared. It is the only one resembling in purity of color the blue of the spectrum. Eventually a process was discovered for converting the dazzling tint into ultramarine. Nowadays cobalt is the basis of that same hue. For long ultramarine came from Asia —hence its name—"beyond the sea." Lapis lazuli may be considered to contain natural ultramarine, and before the introduction of the artificial, this pigment was very expensive. "Ultramarine ashes" is the residuum left after the color has been extracted. It is used by painters where a neutral tint is required, being of a purer and more tender gray than that produced by a mixture of positive colors.

Lapis is not always deep blue: sometimes pale blue, greenish, violet, reddish, pure green; sometimes flecked with yellow, shining, metallic spots, due to iron pyrites. It is not a homogeneous stone, but a mixture of several substances. The ground mass is white calcite. In this the various minerals are imbedded, in varying proportions. Many of these are hornblende, but the remaining grains are of the true lapis substance, and impart to the mineral its color and other characteristics. If these are present in large quantities, the color of the stone is deep and full; if not, their irregularity makes it patchy. Its hardness is 5.5; specific gravity 2.5.

Lapis, in short, is a limestone, more or less impregnated with pigment and probably formed by the action of granite on limestone, through terrestrial fire. It is what is known as a "contact product." The richest deposits are in Asia, but it is also found in Chili and the neighborhood of Rome and Naples. Mines existed in Central Asia as far back as Marco Polo. It is not as valuable as it once was. The price depends on the purity and depth of color. It is used for various articles, vases, bowls, candle-sticks, and also for decorating interiors. The winter palace at St. Petersburg is thus decorated, and San Martino, Naples. Imitations in glass, also colored agate and azurite are all chemically different.

MALACHITE.

Malachite is green carbonite of copper, formed in copper ore deposits in the Urals, Australia and United States. Its hardness is 3.5 to 4; specific gravity 3.7 to 4; lustre adamantine to vitreous. The bright green of its color is lined by darker shades, the structure concentric, evidence of deposition from a solution in water of successive layers.

In this country it is seldom used for personal adornment, except in connection with azurite, with which it is sometimes found. Cut en cabochon across the alternate layers, a fine mottled effect is produced. But little of this combined form is to be found now, as most of it was melted for copper before it came into vogue for jewelry.

Malachite and to a lesser extent azurite are infinitely more beautiful in the natural state, with the subdued coloring of the mineral, and its soft, fuzzy, velvety texture. Polishing simply makes these lovely greens and blues bold and hard.

AZURITE.

Azurite is a form of chessylite, which is very similar to malachite. It has a fine dark-blue color, like that of lapis-lazuli. In hardness it is 3.7, in specific gravity it is 3.8, so it is both softer and denser than lapis. Its lustre is vitreous and the mineral takes a good polish.

BENETOITE.

New minerals or substances have lately been found, but play little part in personal adornment. Benetoite is one of these, discovered in 1907 in the Mt. Diablo range near the San Benito, Fresno County line, California, by Messrs. Hawkins and Sanders. Chemically it is a very acid titano-silicate of barium, hexagonal, hardness 6 to 6.5, highly refractive. It was said at first that if cut right it would rival the blue sapphire in color and brilliance, but one glance at it shows this to be a wild exaggeration.

PEARL, CORAL, AMBER, JET.

The above are not true members of the mineral world, and therefore fail to interest the lover of precious stones. Pearl and coral, fundamentally, are animal substances, as amber and jet are vegetable.

Oriental pearls are the most beautiful, those with a cream or yellow tint and lively lustre, a tint and lustre that they do not lose from wear, like the perfectly white specimens affected by Occidental peoples. Pearls of the greatest value have a pure Orient white, black, or pink. That is to say, a distinctive color with a lustre that almost sparkles in the light.

Baroque pearls, those of an irregular shape, found mostly in fresh water, are effective in long chains, even if comparatively inexpensive. Indeed, nothing is less impressive, considering its cost, than a string of small pearls. Only the large gems of a queen, whether of Italy or Finance, hold the attention, when clasped about a pretty throat.

A fine Oriental pearl on the lobe of a delicate ear is not without its charm, but there are few ornaments so lacking in durability. Even the opal is less fragile as well as more beautiful. The hardness of pearl as compared to the best opal is about as 4 to 6. The weight of the pearl is a trifle more than opal, 2.7 against 2.2. In ancient jewelry, the settings once occupied by pearls are now either empty or inhabited by a crumbling, discolored, nondescript substance.

More about the pearl will be found under a separate head.

CORAL.

Coral is the product of polyps who make this substance under the surface of the sea. It is found in branches, like a leafless tree, of varying sizes, and irregular shapes, some several feet long, and an inch in diameter, but commonly a foot high and half an inch thick. Red is the usual color, but it is also white and black. The color varies according to fashion. A little while ago it was a very pale pink, bordering on white. Now, a beautiful wild rose is the tint most in vogue. For many years coral has been out of style, but like almost every other material once used in jewelry, it is again commanding attention.

Precious coral is made from the calcareous axis of the "Isis Nobilis," distinguished by its size, hardness, capability of polish, and fine red color.

The polyps consist of a soft gelatinous substance. When they sit undisturbed in their cells, one can see distinctly, by means of a

microscope, that each possesses eight soft, triangular, leafy feelers or tentacles, which are notched on each side, and situated in a circle round the mouth, by means of which they catch their food and bring it to this orifice, whence it goes to a hole in the stomach, well mixed with water, and thence is conveyed in little vesicles to the whole mass of polyps in communication with each other. If the feeler of one is touched ever so slightly, the act is conveyed sympathetically to all in the coral hive. Yet, though possessed of this common sensation, which wonderfully vibrates through the whole organism, they apparently have none of the five senses.

Coral is found off the coast of Africa and Corsica, polished and extensively sold at Naples. An inferior quality, but of good color, is exported by Japan. There is any amount of excellent imitation.

Coral was a greater all-round charm and specific than perhaps any other, and strange to say, in India, Egypt, China, and Italy it preserves much of its meaning to this day. Medicinally it used to be taken as an astringent and, together with a preparation of pearls, was given to infants as a cure for vomiting and colic. It was supposed to be a heart stimulant, curing fevers, and neutralizing poison. Hung on fruit trees, it protected them from hail, lightning, wind, and gave fertility. The Brahmins of the East continue to place it upon their dead, to prevent evil spirits from carrying off the corpse; while in Italy the living wear it as a protection from "The Evil Eye"; and in Egypt, after being treated with lemon and burned, it is taken as a tonic. No stone save jade do the Chinese value more.

Coral is still referred to, in some books, as "Gorgias," because of the deed of Perseus.

You remember Medusa, that awful Gorgon, with her head of snakes, whom no man could kill, because one glance of her wicked eye turned him to stone.

But at last Perseus, acting on a hint from a friend, attacked her rather ungallantly from the rear, and severed her head from her body, ridding the world of one terror by a single blow.

He carried his gory burden to the sea, letting the blood run from the hideous locks into the water. Then, being possessed of sound nerves, and more than usually tired, he fell asleep.

While he slept, the evil charm began to work, even in death. The blood of Medusa, running from the snaky hair into the water, curled about certain ocean growths, turning their beautiful green to stone. And the stone became red, like the ooze enveloping their stems, the blood of the monster.

When Perseus awoke, he could hardly believe his senses. Minerva came along, fearing for her brother's safety. She was equally astonished.

To commemorate his great achievement, she forthwith endowed the new stone shrub, christened by her Gorgias, "in memory of," with every possible power for good, to offset as much as possible the harm done by the Gorgon while living, and this is why coral is so valued to this very hour.

AMBER.

Amber, prized less as an ornament than as safeguard from diseases of the throat, was for long a mystery to the ancients. It is in reality the resin of pre-historic trees, and is found always on the seashore, washed up by the waves. The Baltic coast is the headquarters of amber, though some is found about Japan.

The pale, clear, transparent yellow is the most common, the "clouded," as it is called, opaque yellow, costing more. But the most effective of all is reddish-brown, in the form of large faceted beads, from Sicily.

Its hardness is 2 to 2.5, specific gravity 1.8, and it is very electric.

Poppaea's hair was described by Nero, in the first year of Our Lord, as like amber. Pliny considers this monstrous! Such hair was very much admired in Latin Rome, because extremely rare. It might well have been called, if like the amber of Sicily, "hyacinthine."

JET.

Jet is generally admitted by authorities to be a variety of fossil trees, or coal, often called black amber, particularly on the Baltic coast.

Some insist on regarding it as a black mineral, known to the ancients as gagates, from the river Gagas in Syria, at the mouth of which it was found.

Still others say that most of the jet now used is onyx, a chalcedony chemically treated to produce a fine black stone, usually with a dull polish instead of the bright.

Its hardness is 1.5; specific gravity, 1.3, at once the lightest and softest of "gems."

PEARL.

The pearl, though last, is not least. Ranked among precious stones, it is very far from being a stone, and is therefore less interesting to the mineralogist than to Society. Its origin is not impressive, like that of the diamond, which has to do with cataclysms and subterranean fires, the titanic struggles of our planet to fit itself for man. It is, on the contrary the result of the humble mollusc, lowest of organic life, to protect itself from an intruder, some foreign inorganic substance, such as a grain of sand, a bit of wood, the dead larvae of a fish. The rightful owner of the iridescent watery home sets up a protest, exudes a potent secretion from its useful mantle, and envelops the atom in a soft jelly-like substance enclosed in a sac, which gradually hardening is later covered with concentric layers of nacre, similar to the lining of its shell, and lo, the pearl!

"Unable to resist, to rid itself of the opposing evil, it exercises the power given to it by the Creator and converts the pain into perfection, the grief into glory," says Kunz's "Book of the Pearl," almost the last word on this absorbing subject. In the hardly more poetic verse of Sir Edwin Arnold half a century ago:

> Know you, perchance, how that poor formless wretch—
> The Oyster—gems his shallow moonlit chalice?
> Where the shell irks him, or the sea-sand frets,
> He sheds this lovely lustre on his grief.

To go back as far as Hafiz, he too has his admonitory word and lesson:

> Learn from yon Orient shell to love thy foe,
> And store with pearls the wound that brings thee woe.

The pearl oyster inhabits warm water; it never dwells very far from the Equator. The most ancient fisheries were in the Persian Gulf, about the Island of Behreim, a high dignitary of which once said to a traveler: "We are all, from the highest to the lowest, the slaves of one master—Pearl." Yet now as in the past, the Gulf of Manaar, in the shoal water between Ceylon and India, is the chief source of supply of the best pearls for the whole world. They exist there in great numbers, and while not of the largest size, they are of the finest lustre. The Persian pearls are not as white as those of Ceylon, but are larger. They are yellowish as a rule, though pink and black are sometimes found, if not much valued there. The yellowish are always favorites with the Orientals; they are more becoming to their dusky skins, and are thought to retain their lustre longer. It was a Persian pearl which was shown to the French

jeweler and traveler Tavernier, in the seventeenth century, by the Prince of Muscat, to whom Aurangzebe, the Great Mogul, offered for it in vain $45,000. The description of it by Tavernier sounds very much like that of La Pellegrina, though it weighed only twelve karats to the latter's twenty-eight. It was shown to Tavernier and others after an entertainment at Osman, the trade centre or "port" of the Persian pearl fisheries, as Golconda in India, though far from the sea, was the port for diamonds, and Queratarо in Mexico for opals. Like La Pellegrina, it was said to be "the most beautiful pearl in all the world," and "so clear and lustrous as to appear transparent." The Prince drew it from a small pouch around his neck, and rolled it on the table with his little finger, just as Zosimo did with La Pellegrina.

Next to the Oriental pearls in beauty, and very similar to the Cingalese in every way, are those of Venezuela. It seems strange that the loveliest on the globe, from Persia, Ceylon and Venezuela, those fully entitled to the name Margaretiferae, should have shells of practically no worth and beauty. While the nacreous lining is rich and brilliant, the shell is of small size, ugly appearance and valueless as mother-of-pearl, which is supplied in great quantities by species giving forth very poor pearls—the law of compensation, in full force everywhere. Fisheries as a rule would not pay if the trade in pearl were not supplemented by that in mother-of-pearl, the supply of which is more or less abundant and the demand in arts and manufactures constant.

It seems strange, too, that the pearl oyster, from which come the gems most prized, gracing the necks of the high-born before all others, is called the Margaretifa *vulgaris*. Its Venezuela kinsman escapes this stigma by having the vulgaris changed to *radiata,* which at least has a poetic sound. Of course the "vulgaris" applies more particularly to the shells, which are ordinary and unsightly, and never more so than when decomposing on a Ceylon shore, covered with horrible flies, till they are ripe for opening.

Yet as "The Book of the Pearl" says: "No matter how foul, how coral-covered, or over-grown with sponges and sea-weeds the exterior may be, all is clean and beautiful within."

The great bulk of Ceylon pearls are silvery white, but occasionally they are yellowish, pinkish and so-called black, really brown or slate-colored. The fisheries have now been leased, for a long term of years, to a syndicate called the Ceylon Company of Pearl Fishers. The Government regulates the fishing, and receives a certain proportion of the income, which it was perhaps the more ready to do after a full decade or two of "lean" years. But since this barren period, ending about 1902, the fisheries have been quite prosperous, even before the syndicate gained control. The spring of 1905 witnessed a record catch, when pearl and nothing but pearl was talked continually in those waters, as I personally observed. An accident happening to the boat of the regular line, the little steamer Aska was substituted for a few nights, in the passage across the Gulf of Manaar from Colombo to Tuticorin, It was taken for the purpose from

the pearl fisheries, and the conversation of the officers naturally ran largely on pearl, while we two women, the sole passengers, over the worst stretch of sea, for its size, on the globe, lay white and still. La Pellegrina itself would not have interested us at that crucial hour!

The Netherland East Indies, particularly about Celebes, gives forth some fine white pearls, like the beautiful Macassar shell. Rarely are they colored, though some have a yellowish tinge. They are carried for sale to the free port of Singapore. The fishing there for many years was happy-go-lucky, anybody going in, but recently the Dutch Government has restricted all business to subjects of its own nationality, and such as legally have been endowed with special privileges.

On the northern and western coasts of Australia, more especially in Sharks Bay, have been found remarkable pearls of a deep yellow, and also off the Sulu Islands, in the Malay Archipelago, midway between Borneo and the Philippines. It is in Sulu that the superstition about the yellowish pearl found in the nautilus prevails. If worn in a ring to battle, the warrior will surely be killed.

In most of the warmer waters of the Pacific, notably the South Sea Islands, are found good pearls. The methods of fishing them are primitive; it is here that man most nearly approaches the amphibious species. About Tahiti, the port of the Society Islands, the natives are such wonderful swimmers as to seem fish rather than human. The diver wears no armor, a stone attached to the foot carries him quickly down, and he accomplishes a great deal, as do all pearl divers, when we consider that they can remain below but little over a minute. The helmet, wherever used, brings up more dead men than pearls, they say, and beyond frustrating the tyranny of masters, restricting the hours of labor, and the risk run, it seems better to leave things much as they have been for centuries, particularly the delicate human element, the diver who is the crux of the whole situation.

In the Western world, the most important ocean finds are off the coasts of Mexico, more conspicuously Lower California. Here is the main habitat of the black pearl.

The Panama beds play little part in the market. Valuable pearls are not common, those found do not command a high price, and the fisheries have steadily declined. The colors are from white to green and dead gray, sometimes greenish black, the last being best liked. As a rule they are sold in Paris, because of close commercial relations between France and the Isthmus, not because they are more valued there, whence they sometimes find their way to the United States. These pearls were discovered by Balboa.

On the coast of California, about the Catalina Islands, is found the abalone, or ear shell, a univalve. Occasionally a very beautiful pearl is found in this species, usually irregular in shape, of a lovely green, sometimes fawn color, with an intense flame-like iridescence. Such is the wonderful pear-shaped jewel, weighing over 40 karats, which formed the drop to Nordica's necklace of colored pearls, one

of the most exquisite ornaments in the world. Pearls of various delicate hues are set in filigree gold and present in the best work of the Occident all the subtle charm of the Orient.

The abalone is gathered more for its beautiful shell than its casual pearls, the shell itself bringing hundreds of dollars each, sometimes a thousand or more. In color and iridescence its nacre surpasses anything of the kind anywhere, but the supply of shells is limited, almost as much so as its practicable pearls, few being symmetrical enough for jewelry; though imitations, never far away from any attractive thing, are everything the pearl should be—except true!

About the Bahama Islands, near Florida, flourishes the conch shell, in which is found the finest specimen of the pink pearl. These also are closely imitated in beads of the pale pink coral of Italy, Japan and the West Indies, and sometimes of the conch shell itself. But the lens shows the layers of all these substances to be horizontal instead of concentric, and no imitation, however good, ever yet has been able to reproduce the pearl's special sheen.

Columbus on his third voyage discovered pearls in possession of savages about the Gulf of Paria, South America, near the mouth of the Orinoco. Though the natives used them for decoration, they did not much value them, and readily exchanged them for trifles. The small pearl they valued scarcely at all. It may not generally be known that the seed pearl is not a seed, but the smallest of all pearls. Once it was believed that pearls really propagated themselves, when closely confined and covered with rice. But seed pearls are those too minute to be used in any way except as a decoration for a background of mother-of-pearl or, strung on horse hair, for ornaments of filigree gold, or on threads of many strands for necklaces. An American woman has such a necklace of twisted strings containing 126,000 pearls!

Most of the pearls found in the streams and brooks of Europe and this country are irregular in shape. From these come the popular baroque, and sometimes a fine sphere, perhaps equal to the Oriental. The lustre may be very beautiful, but usually it is a dead white, suggesting chalk. Colored pearls are found more plentifully in fresh water than anywhere else. While in salt water the color of the pearl follows as a rule that of the shell, white in white, black in black, yellow in yellow, this is not so certain in fresh. Color in any event has no connection with lustre.

A tremendous excitement was created in 1857 by the finding of a magnificent pink pearl at Notch Brook, near Paterson, N. J. It was bought from the carpenter who discovered it by Charles L. Tiffany, who paid for it $1,500, reselling it to a French jeweler for $2,500, who in turn sold it to the young Empress Eugenie, then in the height of her beauty and power and avid of jewels. It weighed 93 grains, or 23½ karats, and was not only gem in color, but of a lovely lustre. It has always been called the Tiffany Queen Pearl, at once the pearl of the queen, and queen of pearls—at least pink ones. At the present time it would be worth $10,000.

The hunger for gems, like the lust for gold, has always been a potent factor in the discovery, conquest and settlement of distant lands. Columbus, Cortes, Balboa, when they sighted the Orinoco, Peru, Panama, each had an eye out for emeralds and pearls. So did Vasco di Gama, and farther back still, no less a personage than Julius Caesar. The pearl, that elusive gem called Margarita, so coveted by every Roman dame, quite as much as mere personal ambition, is said to have lured Caesar to Britain. It was he, not some humble fisherman, who valued at its worth the first fresh-water pearl, which centuries later responded all too well to Society's thirst for ornament. For already is there danger of the total destruction of the mussel, so carelessly has it been handled by those intent on its hidden treasures. Like many another before them, they forget that they are daily killing the goose that lays the golden egg. Even an inoffensive bivalve, if its enemies are too active and many, is capable of extinction. 1734 0

While the ideal pearl is white, it is not an intense white, but one with a warm, almost yellowish tone, like certain beautiful teeth, with which they are often compared. Or silvery, moonlight white, "la gran Margherita," as Dante calls it. The chalky white, without lustre, which by reason of the present extreme demand has a market, is not to be compared to the other, though it may be perfect in shape. While the public is not yet so familiar with their defects, there is just as much difference between pearls as diamonds, and their value goes up and down accordingly. But a well-matched string of large, round, lustrous pearls is far more difficult of attainment than a similar quality of diamonds, and nowhere in the world are purchasers so keen on perfection as in the United States.

Women affect pearls, for one thing, because, if brunette, there is no jewel more becoming, the contrast between the dark hair and eyes, if the teeth are good, and the creamy spheres, whether on neck, hair, or ears, being peculiarly engaging. With a blonde they are less in harmony, but what type will be deterred by a little thing like that, if fashion leads her on? Americans, for a long time, were indifferent to the pearl—which some think the finest jewel flower of a high civilization; but a few years ago, the madness seized them. They paused in the rush for diamonds long enough to annex loads of these frail gems of the ocean, and now every one in Society, whether her beauty is enhanced thereby or not, must have her "string." Held almost exclusively by the aristocracy, the common people have passed them by. Their reserved charm is not for the business suit or cotton gown, but for the adornment of those who do not toil.

Yet the Queen of England fails to wear them well, as a recent picture, crowded with ornament, but too plainly shows. Nor does many a possessor of wealth untold, who uses them, string upon string, like potentates dethroned, for vain display. Pearls accord only with elegant simplicity; they cry out for the severity of a classic neck, crowned with dark abundant hair, above unadorned

white satin or black velvet; pearl owners need lessons in tailoring not less than in "type." No gem is more becoming to the Orientals, with their white teeth, coffee-colored skins and midnight eyes, and in India the men wear them too, at least the Gaikwars and Maharajahs, who affix them like the artists they often are.

The price of a large, lustrous, Oriental pearl is much above its mate in diamonds, not only because the demand just now is great, but because a pearl cannot be cut to order. It may be doctored and improved a bit, or cunningly set to hide defects, but its absolute worth is almost exclusively up to the mollusc! If, like many human laborers, he is careless or lazy, or if an accident to his jeweled mansion lets in the winds or waves, the pearl will never be the joy it might have been under conditions more serene. Few have any idea how rare are the perfect. Even when obtained, they often prove disappointing—are easily discolored by fire, damaged by rough handling, losing lustre through cold or neglect, while a child can reduce them to powder. Like the opal, the pearl is sensitive to low temperatures, and its lustre marvelously improved by the warmth of the body. To the economist, which the woman grown rich through man's labor generally is not, it seems absurd to invest fortunes in such a perishable object when, unlike the diamond, the pearl is becoming only to those who as a rule cannot afford them—the young.

The native who, clutching emerald or jade, sold pearls to the white man for a song, rated them at their physical worth. Yet he soon became sophisticated, observing the stranger's inexplicable appetite for their frail charm. He still readily lets them go, not for broken glass, however, but for their weight over and over in gold.

It is said that the pearl, as a jewel, is not ancient—not much older than the Christian era. Many contend that it was not mentioned in the Old Testament, supposed to have been completed 400 B. C., the confusion in gem nomenclature between the ancients and moderns accounting for such reference when occurring. Pearls were not worn to any extent till the extravagance of the Romans caused them to scour land and water, the mountain and the desert, for their personal adornment.

There is Cleopatra with her pearl, of course, Clodius with his, and Sir Thomas Gresham, flattering Queen Elizabeth, a long way after, with his; but doesn't it seem stupid rather than interesting to swallow a pearl like a pill, simply to invent a new extravagance? They must have been taken whole or in the form of powder, for it has been proved that pearl will not dissolve in either vinegar or wine —its matrix at least, soft but insoluble, remains. As the only possible excuse for such an action must be its spontaneity, the direct result of the intoxication of the moment, modern scientists make Cleopatra and her imitators seem calculating rather than impassioned.

Imitations in fish-scale are often so good that many honest people may be pardoned for preferring the comely false to the ugly real. Strong glass is blown out, lined close to the surface

with a composition, invented by the French, made from the scales of the bleak fish, and the bead filled with wax. While lighter in weight than true pearl, its lustre is often so much more perfect than any save the rarest pearls as to deceive completely. Few can tell the difference when on the ear or around the neck, for average pearl is often far from attractive in either color, lustre or shape, and might easily be taken for an inferior substance, while the imitation seeks to reproduce only the gem quality. The fish-scale is not the ordinary glass bead, sold in gilt mounting for a few cents, nor the so-called "Roman" pearl, made of something not unlike candy. A pair of ear-screws set in solid gold, brings near ten dollars, while necklaces often cost three or four hundred.

There are imitations of black pearl in coal, fine spheres of lovely tone and lustre, almost more beautiful than the real, except the finest specimens.

Cattelle tells of a wonderful pearl necklace, worn by the Countess Henckel, which for value and associations is unrivalled. It is composed of three strands, each at one time being separate. One was the famous string of the Empress Eugenie, valued at $100,000; another "the necklace of the Virgin of Atokha," formerly owned by a member of the Spanish nobility; the third belonged to the ex-Queen of Naples. But, for actual value, the writer continues, this is exceeded by a single strand, lately bought by a millionaire of our western states, composed of thirty-seven pearls, varying from 18 to 53¾ grains each, the combined weight 979¾ grains, or 267½ karats, appraised at $400,000. The Empress Eugenie's celebrated necklace of matchless black pearls sold at Christie's in London for $20,000, after the removal of the pearl forming the clasp, for which the Marquis of Bath paid $5,000, and which sold later for over $7,000, as the chief ornament of a bracelet.

Not all pearls called black are what they claim. The ideal is what black should be, without metallic lustre or polished shine. It is neither gray nor brown, but true black, soft, dense, exquisite, the loveliest of all black gems, perhaps the loveliest of all gem pearls.

The "orient" is that lively lustre that almost sparkles in the light, of which the most beautiful pearl in the world, La Pellegrina, now in the Museum of Zosimo, Moscow, is a shining example. It is an East Indian product, perfectly round, incomparably lustrous and weighs about 28 karats. No pearl is more famous.

In course of time all pearls, like all mankind, die. That is, they lose their beauty, if they do not actually crumble to dust. The life of a pearl depends somewhat on its own nature, somewhat on the care it receives, but at best its span is extremely short. Scarcely an attractive pearl in existence is three centuries old, and many fade almost as quickly as their owners. Careless handling, atmospheric changes, noxious gases, intense heat injure the pearl as much as the child. Woe to the pearls taken to incompetent workmen for repairs. Instantly a beautiful gem may be converted by fire into a dead thing, discolored and forlorn. Nor is the safe deposit box a good place for them. Like cigars, they need, for their best health, a moist

atmosphere. Always in storage a damp sponge should be placed with them.

No wonder many believe the pearl both lives and dies. The chemical changes that insensibly take place in its constitution are appalling. It would seem, indeed, as if its body sickened, and its soul passed away. One can understand how more credulous generations believed that pearls brought tears. They do, in a sense, even to this hour.

Yet the pearl was not always significant of ill-luck, as are shown by some lines of Browning, who ought to know, being a poet, the magic of a gem:

> A simple ring, with a single stone,
> To the vulgar eye, no stone of price;
> Whisper the right word, that alone—
> Forth starts a sprite, like fire from ice,
> And lo, you are lord (says an Eastern scroll)
> Of Heaven and earth, lord whole and sole,
> Through the power in a pearl!

The pearl is the one jewel in history connected with sorrow. All else were coveted by the great majority less for their beauty than their benign mystical influences. But the pearl as the herald of woe was feared throughout the Middle Ages and down even to our time. The night before her husband's assassination the wife of Henry IV. of France dreamed her diamonds were turned to pearls. Three nights in succession before the battle of Flodden Field, which made her a widow, the wife of James IV. of Scotland dreamed of pearls. There are women to-day, foolish maybe, who are afraid to wear a pearl. One such says the day has never dawned when she could put one on without trouble closely following. Pearls spell tears.

Though unmistakably the herald of sorrow, the pearl at the same time stands for purity and innocence, and is, therefore, appropriate for the young. It is the alternate natal stone for February and June. Some mothers give their daughters a pearl for each birthday, and finally string them into a strand which charms, despite its hint of accummulated misfortune. Yet, while pleasing to the girls and the jewelers, such may become an inconvenient witness to the flight of time, unless one is careful to lose a few, or ceases the collection suddenly.

"The high value attached to the pearl by the ancient Hebrews is illustrated by a beautiful Rabbinical story in which only one object in nature is ranked above them," says that repository of rare knowledge, "The Book of the Pearl," from whose influence it is difficult to break away:

On approaching Egypt, Abraham hid Sarah in a chest, that foreign eyes might not behold her beauty. When he reached the place for paying custom dues, the collector said: 'Pay us the custom'; and he replied, 'I will pay your custom.' They said to him, 'Thou carriest clothes'; and he stated, 'I will pay for clothes.' Then they said to him, 'Thou carriest gold'; and he answered, 'I will pay for gold.' On this they said to him, 'surely thou bearest the finest silk' and he replied 'I will pay custom for the finest silk.' Then said they, 'Truly it must be pearls that thou takest with thee'; and he answered, 'I will pay for pearls.' Seeing that they could name nothing of value for which the patriarch was not willing to pay custom, they said, 'It cannot be but that thou open the box and let us see what is within.' So the chest was opened, and the land was illumined by the light of Sarah's beauty.

ARTIFICIAL REPRODUCTION.

The diamond and the ruby, king and queen of gems, are the simplest in construction, the diamond pure carbon, the ruby pure alumina; both the commonest of all things in nature; for alumina is an earth always under our feet, and carbon we expel with every breath.

Any chemist can tell of what diamond is composed, and where to find the ingredients, yet no one has been able to reproduce it artificially, except in such minute imperfect crystals as to travesty nature.

They are imitated, though, so skillfully that by evening light experts themselves, if not able to handle them, are sometimes deceived, but a few weeks wear is apt to render the finest quality of rhinestones flat and dull. Exposed to the air, with its accompanying moisture, some chemical change takes place. Rock crystal is in time subject to this change. White sapphire and topaz withstand it, but they have no prismatic play. Colorless zircon only, in a faint degree, presents to the end the diamond's distinct charm.

Experiments in the artificial reproduction of corundum, or ruby, were begun by Gaudin in 1837; Ebelmen continued them in 1852; but it was the lately deceased Fremy who made the greatest strides, and who at last, in connection with Feil and Verneuil, reached results which eventually were to have an important bearing on the trade. While the crystallization of alumina had gone on for years, it was not till the period from 1877 to 1890, when these men took hold, that it assumed anything like industrial proportions. The first successful ruby crystals were so infinitesimal that their angles had to be observed through the microscope. This revealed them attached to a foundation of amorphous alumina upon which they sparkled like crimson frost-work.

Oddly enough, in the early eighties a Swiss priest, who lived in seclusion near Geneva, seems to have forestalled Fremy, so far as commercial expression goes. This man of God was the first to place "reconstructed" rubies on the market, and by the scientific process of crystallization. Some have contended that the product was accomplished by fusion, generally resulting in a lighter and softer stone, but Emil Freund asserts that close examination proves them to be actual ruby, formed by heat and duly crystallized, only showing through the lens, by spherical or pear-shaped bubbles, their human origin. These gems were delivered in the rough to a lapidary in Geneva whence, after cutting, they reached America in 1886. Some were small and inferior, unfit even for mechanical purposes, but others sold high as $150 a karat and were brilliant as

the finest Burmese gems. A few of them are still to be found in possession of dealers and connoisseurs, but the secret of the process was lost in the death of the inventor, though the present output seems to have been constructed on the same principle.

In 1889 some "scientific" rubies were imported by a New York firm. They were examples of the old Indian cut, and were here recut in modern style, but when examined by the Columbia School of Mines, were found to be fused from natural rubies. While not crystallized, like the true stone, they were somehow even harder than the genuine, which yields to nothing save the diamond. All were of fine color and quality and were sold from $60 to $150 per karat.

The secret of the "reconstruction" of rubies, through the failure of several companies to exploit it, finally became the property of the public, and is now successfully carried on, by means of Paquier's ingenious apparatus, and the improved Verneuil process. They were, and still are, made in great quantities, and their price, through competition, has depreciated in the rough from dollars to cents. These Paquier rubies, first given to the public in 1901, constructed in harmony with the laws of crystallization, by a process and instrument so simple that one wonders it was never thought of before, are physically, chemically, and optically identical with natural rubies, says the eminent French geologist Lacroix; though Pinier, the leading gem expert of Paris, declares that the false can always be distinguished from the true by the lens. The shape of the "inclusions," so prominent a characteristic of natural ruby, will invariably in the artificial be found uniform instead of irregular, while the planes of crystallization are not always discernible.

Reconstructed rubies frequently find their way to Burmah, where they are sold in the bazaars, perhaps innocently, as the true, often returning to Europe in company with the native gems, the most desired of all rubies in the world.

A canny Scotchman was congratulating himself on the wonderful bargain he had made at Mandalay. It was a stone of perhaps five karats, for which fifty dollars was asked, but fifteen taken. Beside a remarkable garnet of the same size, it looked not so unlike it, almost as dark, if more brilliant. The reconstructed rubies first on the market *were* dark, sometimes brownish, and greatly resembled garnets, though recently the improvement in both color and brilliance has been marked. Now they are apt to suggest the pink tourmaline, with its true ruby shade, rather than the garnet.

Under the microscope the natural ruby shows minute cracks or cleavages running through the stone, while the reconstructed reveals bubbles or gas-holes, caused by the cooling process, despite every effort to make this very gradual. As in all artificial products, the lens betrays very regular clouds and inclusions, while the natural, according to Nature's universal law, is exceedingly irregular. Still, it must be remembered, a reconstructed ruby is not exactly a false ruby, simply a reproduction, through scientific knowledge and experiment, of the true. But the value of such is not a tenth of the

Burmese gem, though the price of the latter has come down thereby. Never can the fact be controverted that the counterfeit is made in a few days or weeks, while the true *is* the true—the product of centuries, if not aeons, of God's own methods.

Though highly satisfactory to the eye, artificial sapphires are not intrinsically so perfect as artificial rubies. They are *fused,* not crystallized, and their origin can be detected easily. Chemically precisely the same, except in coloring matter, the ruby seems to assist the scientists, the sapphire to resist them. Sapphires are made by Louis Paris, through a process which differs from ruby in the substitution of the blue of cobalt for the red of chromium, and the mixture of lime, to prevent separation, as against calcined alum, which does not interfere with the desired crystallization. Emil Freund says the latest reconstructed sapphires are identical with the real in every respect, but Victor Barton denies this, declaring that not only in fusion as compared with crystallization, but in chemical composition, density and hardness, they are not, like the ruby, quite the same as the true gem. When doctors disagree, who shall decide?

In the earlier process of artificial reconstruction, ruby consisted of a small crystal of silicate of alumina, corundum in its valueless form, colored by bichromate of potash, kept at a certain temperature by rotation at very high speed. To this central mass was fed small particles of natural ruby till a large bead formed. While this was liable to crack or break when cooled, often it was a great success, identical with the true stone in hardness, weight and composition. Yet in color it used to come out dark, and was also full of bubbles and wavy, circular lines, due to the rotary motion, deceiving the amateur perhaps, but never the expert.

By the Paquier process, the apparatus slightly resembling a hopper, everything is more simple. The melted alumina passes through a fine sieve and slender tube into a position more or less stationary, though it can be manipulated by human hands. The result is crystallization something after the manner of Nature. Every day the method is becoming more and more exact, so that none can afford to be skeptical as to the ultimate moment, the possible final perfection.

Some of the specimens are already excellent, fully equal to a fine pink tourmaline, the ruby's nearest neighbor in light and color, but it seems unlikely that mere man will ever be able to approach the incomparable tint, vitality and fire of the pigeon's blood.

The trouble is that unscrupulous men not only sometimes sell the reconstructed, the synthetic, as the true, but also glass imitations, more dazzling than the scientific at first, which increasing deception of the innocent is suggesting special legislation for the purchaser's protection.

There is a wide difference between real stones made by man, known to the public comparatively recently, and the imitation, usually of glass, in vogue for twenty centuries. Pastes are as old as the Christian era, and doublets have held a conspicuous if not hon-

ored rank for several decades, at first with a slice of the true stone cemented to a colored glass bottom, then with rock crystal performing the same office. The base of all modern pastes is strass, a strong, hard, brilliant glass, invented by Strass of Strassburg.

Corundum is the only substance yet responding to reconstruction. Emerald still defies strenuous efforts in this line, and is found only in doublets or glass. Turquoise, which seems hardly a stone, reappears in a sort of enamel, not the least successful of sterling imitations; topaz masquerades in an inferior material, yellow quartz, occasionally in doublets and frequently in strass; while beryl, peridot, garnet, amethyst, tourmaline, and such opaque stones as jade and rhodonite, comparatively abundant, encourage only frank imitations. The beauty of the zircon is so little known or appreciated that commerce passes it by, and it seems impossible to reincarnate successfully the restless, exquisite opal. Yet already the strange alexandrite, a stone apparently protected by nature from falsity, has been approached through a totally different medium, the sapphire. A stone supposed to be a rare but real alexandrite, amethyst by day and pink tourmaline by night, both colors the best of their kind, is pronounced by Dr. Kunz an artificial sapphire, more hard, brilliant and beautiful than the true—a triumph of man, if the diagnosis is correct; one instance of Nature outdone!

The pearl is imitated almost perfectly. So far as beauty goes, the fish-scale article, by a secret process, known only to the French, is often more lustrous than any save the finest Oriental, with its lovely texture and mellow sheen. If one were to adopt any artificial product, it might be justifiable in the case of this particular substance, not a mineral at all, simply an organic product, often ugly, always frail, and costly beyond reason and belief.

Still, those who care for integrity in either precious stones or human beings instinctively scorn deceit, however clever. No machine-made specimen of these flowers of the mineral world can possibly command the sentiment of one brought forth by the Eternal Mother. To lovers of gems for their own sake, the defective true is infinitely preferable to the perfect false.

METHODS OF TESTING STONES.

Hardness of gems, decided according to an arbitrary scale ranging from 1 to 10, is determined in various ways: to a certain extent by the file; by one gem scratching a lower in the scale; but professionally by four "points" of varying penetration, manufactured for mineralogists and jewelers.

Specific gravity, or the weight of gems, not the weight for trade purposes by karats, but the heaviness as related to others of its kind, is obtained usually by three out of six tubes, containing liquid of varying density. For all practical purposes only three are needed, numbers 4, 5 and 6, but for rare cases there are 1, 2 and 3. Methylene iodide is put into three portions, more in 4 than 5 and still less in 6. 4 is left pure; 5 and 6 have their density proportionally reduced by adding benzine drop by drop, until the indicators are in position, one at the top, the other at the bottom. The liquid must be mixed thoroughly with a glass rod. Then the stone is weighed both in air and in these heavy fluids, the difference in weight between the two mediums, after mathematical working out, determining the specific gravity accurately.

But, if by any chance two stones of the same general appearance should be of the same weight and hardness, there are still other tests, the most effective being the dichroscope, an inexpensive little instrument, in appearance a sort of tiny telescope, which separates the rays of light and determines whether a stone is monochroic or dichroic, that is, with only one color under analysis or several.

The refractometer is another instrument, disclosing the degree of refraction, or bending of light, not commonly used, except by mineralogists.

With a little practice, any jeweler, and even his customers, can learn to make these tests. It should be a congenial task, these delicate but not very difficult experiments, for the deft hands of women. That women of intelligence could become authoritative experts on gems, if so disposed, is practically certain. Above all, women are far more accurate than men in their sense of color.

The more complicated tests are for troublesome cases, and not all, as a rule, are necessary. The "points," or even the jeweler's file, if backed by experience, throw considerable light, while the dichroscope, in nine cases out of ten, will settle the question.

Then, the constant handling of gems, aided by the alert mind, brings its own instruction. The mere look or feel of a stone is betrayal to the connoisseur, and when the lens also is applied, the truth can be obtained very nearly. But this as to the better known stones

only, for many a jeweler who cannot be deceived on diamond, ruby or sapphire, will be doubtful about emerald, and fall down completely before the less familiar objects, such as spinel, zircon, yellow beryl, green garnet, and even true topaz, whose name has been borrowed by citrine.

With the aid of these tests, all problems can be solved, for it is simply a question of cold fact, about which there can be no dispute, though the more ways in which a conclusion can be reached, the more certain it will be, as compared to a single trial.

The very latest practicable test, which is said to be simple and absolutely sure, comes through the microspectroscope, by means of light alone. This instrument has been brought to perfection by Dr. Edgar T. Wherry, assistant curator of the Division of Mineralogy in the United States National Museum, and it is claimed that the instrument makes all others unnecessary. A pamphlet recently published by the Smithsonian Institution describes the system worked out by Dr. Wherry in a technical manner which appeals to the scientific student particularly.

By this method the spectrum plays the star part, all precious stones and their counterfeits are amenable to its influence, and that they can be tested without removal from their settings is interesting to say the least.

Why did not somebody teach me the Constellations, and make me at home in the starry heavens, which are always overhead and I don't half know to this day?

Thomas Carlyle.

GEMS IN THE SKY.

A Suggestion.

Astronomy as a science is almost pure mathematics, but pictorially it is a cosmic marvel and poem. The skies are so infinitely lovely that one can scarcely believe they really exist! They should become a near and dear part of every human being. But mere reading cannot accomplish this. By that road you will never be able to say: "Those are the Pleiades, these are the Hyades, that fine star is Denebola, dancing attendance on Berenice's Hair." One by one you must reverently seek and find them; but to know them once is to know them for all time—like the swimmer's stroke, it never is forgotten.

Home from the mountains one September long ago, depressed that I scarcely knew one star from another, a book of blessed diagrams fell into my hands and I went to work in earnest. Yet craning neck out of windows, rushing wildly into the street to gaze upward till pedestrians stopped and gazed with me; reading at corner lamps till everybody turned and stared—this had its drawbacks. Suddenly I thought of that common retreat in an Oriental home—the roof. Drawing a bolt, I climbed steep steps, lifted a heavy scuttle, fell on an expanse of tin—and found myself in heaven. Star upon star unseen below responded to my appeal, and altogether it was a royal welcome from

> That inverted bowl they call the sky
> Whereunder crawling coopt we live and die.

To compare the diagram with the real thing took endless trips down and back again, there was many a seance on the roof before conjecture became certainty, but come the understanding did at last and to stay.

Given the Great Dipper, the rest, if you care, is comparatively easy. Although I had discovered Vega directly overhead and in the west Arcturus, that favorite of Peary who in the lonely Arctic watched it circling far to the south of him, the wider outlook of the roof revealed a distinctly foreign star, the first-magnitude Spica, in Virgo, glittering close to the southwest horizon before leaving for its winter home in the tropics. Vega, in Lyra, is believed to be the centre of our system; millions of years hence it may be our pole-star—instead of bright Polaris, so much more truly that, in its close proximity to the Pole, than those insignificant Antarctic worlds in like situation. The Southern Cross, which in the south sailors depend upon to steer by, is nearly thirty degrees from the

Pole, while Polaris is practically one degree, and still approaching, so that in two centuries it will be less by half! Polaris is conspicuous as the tip of the Little Dipper's handle, toward which Alpha and Omega in the bowl of the Great Dipper always point, as do the eyes of every northern navigator on the globe. English captains who sail the Seven Seas refer to these figures by their scientific appellations Ursa Major and Minor, Big and Little Bear, not seeming to recognize the interesting dipper figures, though accepted by every school-boy in the United States.

Across the Milky Way from Vega is another of first-magnitude, Altair, in Aquila, the Eagle, easily distinguished by a faint equidistant star on either hand, while slightly northwest of Altair is that small architectural lozenge called Job's Coffin. Between Altair and Vega, lying in the Milky Way, which greatly enhances its splendor, with head pointing north, is the immense Northern Cross. Many prefer this to the Southern Cross because of its great size and perfect symmetry, though of its eight stars there is but one bright one—Deneb, at the top. A line drawn from Altair to Arcturus passes through the Northern Crown, a sparkling diadem of five small stars with a larger gem appropriately in the centre.

South of Cassiopeia, that circumpolar constellation in the form of an open W, a line of stars leads to the great square of Pegasus, the Flying Horse, the whole thing not unlike a deep, long-handled sauce-pan. You can also witness in September the closing moments of Scorpio, which soon migrates, like the birds, to the south. It is easily identified by its stunning first-magnitude star Antares, which in its great size and red fire rivals the planet Mars—whence its name, anti-Mars. East of Scorpio you run against Sagittarius, the Archer, six of whose small stars form an inverted dipper perfect in shape and because in the Milky Way known as the Milk Dipper, while east of Sagittarius you can distinguish the three pairs of small stars representing the head, tail and knees of the goat in Capricorn, and still farther east looming above the horizon is Fomalhaut, the eighteenth first-magnitude on the list. Near Fomalhaut this September is Jupiter, glorious as Venus at her best, but minus her soft golden light—sharper, more electric, more masculine!

In December comes the greatest display of all: glorious Orion, the Mighty Hunter, one mass of splendid gems, on knee, belt, shoulders, and along his sword; Aldebaran, red as Antares, in the head of Taurus; Castor and Pollux, the Twins, Procyon, the Dog Star, and Capella, queen of pentagonal Auriga—to say nothing of that finest "Jager" of them all, blue-white Sirius. No section of the heavens from Arctic to Antarctic is so rich and dazzling. In February this galaxy will be followed at a respectful distance by Regulus, in Leo, sometimes called the Lion's Heart. While not a first-magnitude star, Regulus is notably beautiful and advantageously set in the handle of one of the most perfect figures in the firmament, the Sickle.

Each one of these now familiar friends I annexed laboriously, unable to get for love or money any aid beyond this old-time text-

book, though I went on my knees to uninterested navigators, professors, publishers and Uncle Sam himself, who wouldn't sell! The faithful "Heavens Above," by J. A. Gillet and W. J. Rolfe, published in 1882 by Potter, Ainsworth and Company of New York and Chicago, was the only portable thing I could find except an old-fashioned, fine-print atlas which took the eyes out of my head. But within the past few years various popular volumes have appeared. Garrett P. Serviss' "Astronomy with the Naked Eyes," Harper and Brothers, is perhaps the best, together with the Barritt-Serviss movable "Star and Planet-Finder," 150 Nassau Street. Still, I have an affection for my own little out-of-print book, with diagrams in dotted lines from star to star, and drawings indicating why the constellations are named as they are—a good thing for the lone beginner.

At sea one can appeal to the skipper for information, but if he hands over for an hour his valuable charts, you may find yourself instructing *him*—so little do sailors care for any save a few conspicuous stars to steer by.

Around the world I went to the Orient with its thrilling beauty of sky and sea and shore. There the stars are so near you need only stretch out your hand to touch them. Some of the loveliest moments were at Kandy, in Ceylon, when simply to look out into the night was pure joy. A thick mango shaded my window and beyond along the lake were delicate taller trees in silhouette against the sky. One evening the lightning played, while large glow-worms rested on the air. As music drifted out from the hotel, a Cingalese in white drapery paused and watched the gayety within. The stars, the silence, the fireflies, the lightning, the gleaming water, the tropical tree, the motionless figure under it with face upturned, the penetrating fragrance of the sacred champak blossom, so much like our tuberose—cannot you see it all? That is Ceylon—a thing not to analyze but to feel.

Here I was able to gratify an intense desire—the Southern Cross. After a lifetime of longing its beauty enchanted me for nights together. Between midnight and dawn I had only to open my eyes to make it mine—this marvelous symbol of Christ's love and renunciation describing its small arc around the Pole. Even though it falls short of perfection, bereft of a central star to unite its four arms, "Croce Maravigliosa," as Pigafetta called it, is a thing of supreme loveliness and meaning. Besides its four sparkling brilliants, Alpha at the base one of the largest in the skies, there is within its diamond-shaped quadrilateral Herschel's "gorgeous piece of fancy jewelry," that nebulous cluster of many-colored gems about which astronomers wrangle.

Seven years later I again found myself in the East, a bit ashamed of such a wanderlust until I found I couldn't help it—that on a certain heraldic device I have the right to use are the words: "Per mare, per terras." The ultima thule this time was the island of Java, whose exotic charm Joseph Conrad expresses in a few masterly words:

I have seen the mysterious shores, the still waters, the lands of brown natives . . . but for me all the East is contained in the vision of my youth. . . . And this is all there is left of it! Only a moment; a moment of strength, and romance, and glamour! . . . A flick of sunshine on a strange shore, the time to remember, the time for a sigh—goodby!

From Batavia we started for Djogjakarta at 4 A. M. Difficult it is to get the eyes open at that hour, but the Oriental bath in the spring-house, twenty gourdfuls poured down the spine, helps some and strong black coffee does the rest. Never was a place, a time, a condition, more poetic than the green court of the Hotel der Nederlanden at that hour, all fresh and sweet from rain. In the southwest blazed the Southern Cross, with the faithful Centaurii, while across the way from red Antares, high in the heavens, was red Mars. The strange, still hour; the scent of wet flowers and foliage, led by the insistent perfume of the frangipani; the white orchids staring from the trees with their thousand eyes; the noiseless natives in attendance, the crunch of carriage wheels upon the gravel, the landlord waiting patiently in trousers and bare feet to bid a kind good-bye—this was Java!

When half a dozen years later the Equator was crossed a second time, to the Strait of Magellan, another dream came true. Beside fifty-five degrees south, Java's nine looked small. Yet the tropic glory of Batavia, at this desolate land's end, was remembered almost painfully. The sole compensation lay in the attainment of those Antarctic worlds guarding the virgin South Pole, and to see the resplendent Southern Cross almost overhead! One clear, dark night on the voyage to Valparaiso I was able to round up everything: the Coal Sack, that black deep in the Milky Way, close to the Cross, which even hardened astronomers regard with awe; the minor Magellanic Clouds, mostly in Hydrus, not only smaller but duller than the major in Dorado—contrary to the opinion of astronomic authorities. Every South Polar star hitherto dimmed by the moonlight stood out and sang its own eloquent song, while the Milky Way was a sight to make the heart stand still. Without effort I identified the constellations Crater; Musca; Norma; Lupus; Triangulum; the Crow; Eridanus, famous for Achenar, clean, cold, electric, imperious; all the second-magnitude stars in Carina, keel of Argo the Ship, home of godlike Canopus, my first tropical luminary, adored long before I knew he was the biggest thing of his kind in the Universe!

At Santiago de Chili, within the shadow of that Rock of Ages, beautiful Santa Lucia, Scorpio with his bloody eye and wicked stinging tail followed me right into the open court of the hotel around which were grouped the dormitories. So not before Los Andes, midst its lush vegetation at the foot of the Cordilleras, where you pause for breath before climbing those mighty flanks, did I seem really to bid the southern stellar worlds good-bye; for at Buenos Ayres I noticed only that the sunny side of the Avenue de Mayo faced north and that Orion in the zenith was—upside down!

Love, the fair day is drawing to its close,
The stars are rising, and a soft wind blows;
The gates of heaven are opening in a dream,
The nightingale sings to the sleeping rose.

Shadows, and dew, and silence, and the stars;
I wonder, love, what is behind those bars
Of twinkling silver—is there aught behind?—
Venus and Jupiter, Sirius and Mars;

Aldebaran and the soft Pleiades,
Orion ploughing the ethereal seas,—
Which are the stars, my love, and which your eyes?
And, O the nightingale in yonder trees!

Paraphrase of the Rubaiyat by Richard Le Gallienne.

You know how, in and for themselves, I love gems; and how, less and less as the years go on, I have found myself able to wear the few I own. Like fabrics, they seem to me so much more beautiful in themselves than after they are ready to wear—but with this difference: that fabrics worn are legitimately useful, while jewels worn are only ornamental—extrinsic, unreasonable! I can wear a brooch, which *does* something and is beautiful meanwhile; but when I put on a necklace, before I leave the mirror I take it off again.

Well: how to reconcile my love of jewels, which is real, with my inability to be happy with any *on* me! I couldn't have some in a box to look at on occasion—that would be like drinking alone. I thought of it a good deal, and then, reading Landor's "Pericles and Aspasia," I came on this, in a letter to Aspasia from Cleone:

"Your opinion was formerly that we should be careful not to subdivide the person. The arm is composed of three parts; no one of them is too long. Now the armlet intersects that portion of it which must be considered as the most beautiful. In my idea of the matter, the sandal alone is susceptible of gems, *after the zone has received the richest.* The zone is necessary to our vesture in every quarter of the humanized world in one invariable manner."

There it is. Then I knew. I can have my jewels in a girdle. Ah, well, at least I have a direction for my imaginings in gems, and I need no longer feel a little sad, a little alien, when I think of them. Something beautiful to use, not merely to *hang on,* have I discovered in the region of the gemness I so glorify.

ZONA GALE.

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